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[Inventor]

[Address] c/o Sony Corporation, 7-35, Kitashinagawa
6-chome, Shinagawa-ku, Tokyo

[Name] Ayako WATANABE

[Inventor]

[Address] c/o Sony Corporation, 7-35, Kitashinagawa
6-chome, Shinagawa-ku, Tokyo

[Name] Yoshikazu TAKASHIMA

[Applicant for Patent]

[Id. No.] 000002185

[Name] Sony Corporation

[Agent]

[Id. No.] 100093241

[Patent Attorney]

[Name] Masaaki MIYATA

[Phone No.] 03-5541-7577

[Sub-agent]

[Id. No.] 100101801

[Patent Attorney]

[Name] Eiji YAMADA

[Phone No.] 03-5541-7577

[Sub-agent]

[Id. No.] 100086531

[Patent Attorney]

[Name] Toshio SAWADA

[Phone No.] 03-5541-7577

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[Name of Document] CLAIMS

[Claim 1]

An information processing device comprising:

a recording medium interface for executing reading of data from an information recording medium; and

a data processing unit for executing recording processing of new data either generated or obtained applying information obtained from the information recording medium;

wherein the information recording medium is an information recording medium storing recorded data in increments of content management units including encrypted data encrypted by unit keys each of which are set as different encryption keys; and

wherein the data processing unit is configured to obtain a unit key corresponding to a content management unit to which the obtained information belongs or a unit key corresponding to a new content management unit, executes encryption processing of the new data applying the obtained unit key, and executes recording processing with the generated encrypted data as data configuring the content management unit.

[Claim 2]

The information processing device according to Claim 1, wherein the data processing unit is configured to set a content management unit corresponding to the new data, and

also execute setting processing for an encryption key serving as management information corresponding to the content management unit including the new data.

[Claim 3]

The information processing device according to Claim 1, wherein the data processing unit is configured to set a content management unit corresponding to the new data, and also execute setting processing for content usage control information serving as management information corresponding to the content management unit including the new data.

[Claim 4]

The information processing device according to Claim 1, wherein the data processing unit is configured to execute writing processing of the new data to a region stipulated by a program included in the information obtained from the information recording medium.

[Claim 5]

The information processing device according to Claim 1, wherein the data processing unit is configured to, in a case of storing the new data in storage means other than an information recording medium from which the information has been obtained, execute processing for storing identification information of the information recording medium, from which the information has been obtained, while correlating with the new data.

[Claim 6]

An information processing device comprising:
a recording medium interface for executing reading of data from an information recording medium; and
a data processing unit for executing processing of a program included in reading information from the information recording medium,

wherein the data processing unit determines a type of the information recording medium from which the program is read, and executes the program under a condition of confirming that the type of the information recording medium is a type to which execution of the preset program is permitted.

[Claim 7]

The information processing device according to Claim 6, wherein the data processing unit is configured to obtain type information of the information recording medium to which the execution of the program is permitted from the reading information from the information recording medium, and determine whether the program can be executed according to the obtained information.

[Claim 8]

An information processing method comprising:
a data reading step for reading data from an information recording medium; and

a data processing step for executing recording processing of new data either generated or obtained applying information obtained from the information recording medium;

wherein the information recording medium is an information recording medium storing recorded data in increments of content management units including encrypted data encrypted by unit keys each of which is set as different encryption keys; and wherein the data processing step includes:

an obtaining step for obtaining a unit key corresponding to a content management unit to which the obtained information belongs or a unit key corresponding to a new content management unit;

an executing step for executing encryption processing of the new data applying the obtained unit key; and

an executing step for executing recording processing with the generated encrypted data as data configuring the content management unit.

[Claim 9]

The information processing method according to Claim 8, wherein the data processing step includes the steps of setting the content management unit corresponding to the new data, and executing setting processing for the encryption key serving as management information corresponding to the content management unit including the new data.

[Claim 10]

The information processing method according to Claim 8, wherein the data processing step includes the steps of setting the content management unit corresponding to the new data, and executing the setting processing for content usage control information as management information corresponding to the content management unit including the new data.

[Claim 11]

The information processing method according to Claim 8, wherein the data processing step includes the step of executing the writing processing of the new data to a region stipulated by the program included in the information obtained from the information recording medium.

[Claim 12]

The information processing method according to Claim 8, wherein the data processing step executes, in a case of storing the new data in storage means other than the information recording medium from which the information has been obtained, processing for storing identification information of the information recording medium, from which the information has been obtained, while correlating with the new data.

[Claim 13]

An information processing method comprising the steps of:

a data reading step for reading data from an information recording medium; and

a data processing step for executing processing of a program included in the reading information obtained from the information recording medium,

wherein the data processing step includes the steps of:
determining a type of the information recording medium, from which the program is read; and

executing the program under a condition of confirming that the type of the information recording medium is a type to which execution of the preset program is permitted.

[Claim 14]

The information processing method according to Claim 13, wherein the data processing step includes the steps of obtaining type information of the information recording medium, to which the execution of the program is permitted, from the reading information from the information recording medium, and determining whether the program can be executed according to the obtained information.

[Claim 15]

A computer program for executing information processing comprising the steps of:

a data reading step for reading data from an information recording medium; and

a data processing step for executing recording

processing of new data either generated or obtained applying information obtained from the information recording medium,

wherein the information recording medium is an information recording medium storing recorded data in increments of content management units including encrypted data encrypted by unit keys each of which is set as different encryption keys; and

wherein the data processing step includes:

an obtaining step for obtaining a unit key corresponding to a content management unit to which the obtained information belongs or a unit key corresponding to a new content management unit;

an executing step for executing encryption processing of the new data applying the obtained unit key; and

an executing step for executing recording processing with the generated encrypted data as data configuring the content management unit.

[Claim 16]

A computer program for executing information processing comprising the steps of:

a data reading step for reading data from an information recording medium; and

a data processing step for executing processing of a program included in the reading information obtained from the information recording medium,

wherein the data processing step includes the steps of:
determining a type of the information recording medium,
from which the program is read; and
executing the program under a condition of confirming
that the type of the information recording medium is a type
to which execution of the preset program is permitted.

[Name of Document] SPECIFICATION

[Title of the Invention] INFORMATION PROCESSING DEVICE,
INFORMATION PROCESSING METHOD, AND COMPUTER PROGRAM

[Technical Field]

[0001]

The present invention relates to an information processing device, an information processing method, and a computer program. More particularly, the present invention relates to an information processing device, an information processing method, and a computer program, in which information, newly generated or downloaded by a user in relation to content information stored in an information recording medium in increments of units, is recorded as managed data corresponding to the units, with secure data management and usage management being realized for each unit of the newly generated data as well.

[Background Art]

[0002]

Various kinds of software data, such as audio data like music and so forth, picture data like movies and so forth, game programs, various kinds of application programs, and so on (hereafter collectively referred to as "content"), can be stored in recording media, such as Blu-ray disks which use blue laser, or DVDs (Digital Versatile Disc), MDs (Mini Disc), CDs (Compact Disk), or the like, as digital data.

Particularly, Blu-ray disks which use blue laser are capable of high-density recording, and can record great amounts of picture contents and the like as high-definition data.

[0003]

Digital contents are stored in such various types of information recording media (recording media), and are provided to the user. The user reproduces and uses the contents using a reproducing device such as a PC (Personal Computer), and disk player, or the like.

[0004]

With many contents, such as music data, image data, and the like, generally, the distribution rights thereof are held by the author or vendor. Accordingly, an arrangement is generally made such that certain usage restrictions are applied to distribution of such contents, i.e., so that only authorized users can use the contents, and that unauthorized duplications and so forth are not made.

[0005]

With digital recording devices and recording media, data can be repeatedly recorded and reproduced without deterioration in image quality or audio quality, for example, and accordingly, there is the problem of widespread distribution of unauthorized copies of contents via the Internet, so-called bootleg disks in which contents are copied to CD-Rs or the like, and usage of copied contents

stored on hard disks of PCs and the like.

[0006]

Large-capacity recording media such as DVDs, and blue-laser recording media developed in recent years, are capable of storing great amounts of digital information, one to several movies worth on one disk, for example. The capability to record such picture information and the like as digital information makes preventing unauthorized copies to protect copyright holders an even more important issue. Heretofore, various techniques have been put into practice for preventing unauthorized copying with digital recording device and recording media, in order to protect such unauthorized copying of digital data.

[0007]

For example, Content Scramble System is used with DVD players. With Content Scramble System, video data, audio data, etc., is recorded in a DVD-ROM (Read Only Memory) in an encrypted form, and a key to be used for decrypting the encrypted data is provided to a licensed DVD player. A license is provided to a DVD player designed to follow predetermined action stipulations, such as not performing unauthorized copying and so forth. Accordingly, licensed DVD players can reproduce the images and audio from the DVD-ROM by using the key provided thereto to decrypt the encrypted data recorded in the DVD-ROM.

[0008]

On the other hand, unlicensed DVD players do not have a key for decrypting the encrypted data, and accordingly cannot decrypt the encrypted data recorded in the DVD-ROM. Thus, in the Content Scramble System configuration, DVD players which do not satisfy conditions required at the time of licensing cannot reproduce from the DVD-ROM storing digital data, thereby preventing unauthorized copying.

[0009]

In this way, a management system for content stored in information recording media has been established. However, secure data management and usage management is far from being realized regarding data generated by a user executing a program stored in information recording media as content, and data content obtained from external servers, and so forth.

[0010]

In the event of performing secure management of data generated by users executing programs stored in information recording media and data content obtained from external servers, individual data needs to be handled by the user, for example, protecting with his/her own password, applying an encryption key externally obtained to create encrypted data, and so forth. Such a data management configuration results in the problem of an increased number of encryption

keys and passwords to manage in the event that generated data and obtained data increase, the location of data readily becomes unclear, and further the correlation of stored data and encryption keys/passwords also becomes unclear. Another current issue is that sufficient measures are not implemented for the usage management regarding such new data.

[Disclosure of the Invention]

[Problems to be Solved by the Invention]

[0011]

The present invention has been made in light of the above, and accordingly it is an object thereof to provide an information processing device, an information processing method, and a computer program, for recording new data such as information which a user has generated or information which has been downloaded newly in relation to content information in increments of units stored in an information recording medium, as managed data corresponding to the units, so as to realize secure data management and usage management of newly-generated data as well.

[Means for Solving the Problems]

[0012]

According to a first aspect of the present invention, an information processing device is characterized in including:

a recording medium interface for executing reading of data from an information recording medium; and

a data processing unit for executing recording processing of new data either generated or obtained applying information obtained from the information recording medium,

in which the information recording medium is an information recording medium storing recorded data in increments of content management units including encrypted data encrypted by unit keys each of which are set as different encryption keys, and in which the data processing unit obtains a unit key corresponding to a content management unit to which the obtained information belongs or a unit key corresponding to a new content management unit, executes encryption processing of the new data applying the obtained unit key, and executes recording processing with the generated encrypted data as data configuring the content management unit.

[0013]

Further, according to an embodiment of the present invention, the information processing device is characterized in that the data processing unit is configured to set a content management unit corresponding to the new data, and to execute setting processing for an encryption key serving as management information corresponding to the content management unit including the new data.

[0014]

Further, according to an embodiment of the present invention, the information processing device is characterized in that the data processing unit is configured to set a content management unit corresponding to the new data, and to execute setting processing for content usage control information serving as management information corresponding to the content management unit including the new data.

[0015]

Further, according to an embodiment of the present invention, the information processing device is characterized in that the data processing unit is configured to execute writing processing of the new data to a region stipulated by a program included in the information obtained from the information recording medium.

[0016]

Further, according to an embodiment of the present invention, the information processing device is characterized in that the data processing unit is configured to, in a case of storing the new data in storage means other than an information recording medium from which the obtained information has been obtained, execute processing for storing the identification information of the information recording medium, from which the obtained information has

been obtained, while correlating with the new data.

[0017]

Further, According to a second aspect of the present invention, an information processing device is characterized in including:

a recording medium interface for executing reading of data from an information recording medium; and

a data processing unit for executing processing of a program included in reading information from the information recording medium,

in which the data processing unit determines a type of the information recording medium from which the program is read, and executes the program under a condition of confirming that the type of the information recording medium is a type to which execution of the preset program is permitted.

[0018]

Further, according to an embodiment of the present invention, the information processing device is characterized in that the data processing unit is configured to obtain type information of the information recording medium to which the execution of the program is permitted from the reading information from the information recording medium, and to determine whether the program can be executed according to the obtained information.

[0019]

According to a third aspect of the present invention, an information processing method is characterized in including the steps of:

a data reading step for reading data from an information recording medium; and

a data processing step for executing recording processing of new data either generated or obtained applying information obtained from the information recording medium, in which the information recording medium is an information recording medium storing recorded data in increments of content management units including encrypted data encrypted by unit keys each of which is set as different encryption keys, and in which the data processing step includes:

an obtaining step for obtaining a unit key corresponding to a content management unit to which the obtained information belongs or a unit key corresponding to a new content management unit;

an executing step for executing encryption processing of the new data applying the obtained unit key; and

an executing step for executing recording processing with the generated encrypted data as data configuring the content management unit.

[0020]

Further, according to an embodiment of the present

invention, the information processing method is characterized in that the data processing step includes the steps of:

setting the content management unit corresponding to the new data; and

executing setting processing for the encryption key serving as management information corresponding to the content management unit including the new data.

[0021]

Further, according to an embodiment of the present invention, the information processing method is characterized in that the data processing step includes the steps of setting the content management unit corresponding to the new data, and executing the setting processing for content usage control information as management information corresponding to the content management unit including the new data.

[0022]

Further, according to an embodiment of the present invention, the information processing method is characterized in that the data processing step includes the step of executing the writing processing of the new data to a region stipulated by the program included in the information obtained from the information recording medium.

[0023]

Further, according to an embodiment of the present invention, the information processing method is characterized in that the data processing step executes, in a case of storing the new data in storage means other than the information recording medium from which the information has been obtained, processing for storing identification information of the information recording medium, from which the information has been obtained, while correlating with the new data.

[0024]

Further, according to a fourth aspect of the present invention, an information processing method is characterized in including:

- a data reading step for reading data from an information recording medium; and

- a data processing step for executing processing of a program included in the reading information obtained from the information recording medium,

- in which the data processing step includes the steps of:

- determining a type of the information recording medium, from which the program is read; and

- executing the program under a condition of confirming that the type of the information recording medium is a type to which execution of the preset program is permitted.

[0025]

Further, according to an embodiment of the present invention, the information processing method is characterized in that the data processing step includes the steps of obtaining type information of the information recording medium, to which the execution of the program is permitted, from the reading information from the information recording medium, and determining whether the program can be executed according to the obtained information.

[0026]

Further, according to a fifth aspect of the present invention, a computer program for executing information processing is characterized in including the steps of:

- a data reading step for reading data from an information recording medium; and

- a data processing step for executing recording processing of new data either generated or obtained applying information obtained from the information recording medium;

- in which the information recording medium is an information recording medium storing recorded data in increments of content management units including encrypted data encrypted by unit keys each of which is set as different encryption keys; and

- in which the data processing step includes:

- an obtaining step for obtaining a unit key

corresponding to a content management unit to which the obtained information belongs or a unit key corresponding to a new content management unit;

an executing step for executing encryption processing of the new data applying the obtained unit key; and

an executing step for executing recording processing with the generated encrypted data as data configuring the content management unit.

[0027]

Further, according to a sixth aspect of the present invention, a computer program for executing information processing is characterized in including the steps of:

a data reading step for reading data from an information recording medium; and

a data processing step for executing processing of a program included in the reading information obtained from the information recording medium,

in which the data processing step includes the steps of: determining a type of the information recording medium, from which the program is read; and executing the program under a condition of confirming that the type of the information recording medium is a type to which execution of the preset program is permitted.

[0028]

Incidentally, the computer program according to the

present invention is a computer program that can be provided to, for example, a computer system that can execute various types of program codes, by storage media that is provided in a form that is readable by a computer, communication media, recording media, such as DVD, CD, MO, and so forth, or communication media such as network and so forth. By means of providing such a program in the form readable by the computer, the processing corresponding to the program can be realized on the computer system.

[0029]

Still other objects, characteristics, and advantages of the present invention will be clarified by the detailed description based on the embodiments of the present invention described later and the accompanying drawings. Incidentally, the system in the present specification refers to a logical aggregation configuration of a plurality of devices, and it is not limited to the configuration where devices of each configuration are contained in the same housing.

[Advantages]

[0030]

According to the configuration of the present invention, new data such as information which a user has newly generated in relation to content information in increments of content management units stored in an information

recording medium, or downloaded information is recorded as content management unit configuration data serving as encrypted data to which a unit key corresponding to the content management unit, or the unit key corresponding to a new content management unit is applied, so secure data management and usage management is realized for newly-generated data in the same way as with the original unit correlated data.

[0031]

Further, according to the configuration of the present invention, in execution of a program included in information read from an information recording medium, the type of the information recording medium from which the program has been read is determined, and the program is executed under a condition of confirming that the type of the information recording medium is a type to which execution of the preset program is permitted, so execution of the program using a copied disk of the content, for example, will be rejected, and unauthorized usage of the contents can be prevented.

[Best Mode for Carrying Out the Invention]

[0032]

Hereinbelow, an information processing device, an information processing method, and a computer program, according to the present invention will be described in detail with reference to the drawings. Note that

description will proceed along the following items.

1. Stored data in information recording medium
2. Content storing configuration
3. Encryption and usage management configuration for stored content
4. Management configuration for newly generated data or obtained data
5. Storage processing of new data generated or obtained by information processing device
6. Configuration for correlating CPS unit configuring data in an information recording medium with CPS unit configuring data stored outside of an information recording medium
7. Processing configuration restricting program execution conditions
8. Configuration example of information processing device

[0033]

[1. Stored Data in Information Recording Medium]

First, stored data in an information recording medium will be described. Fig. 1 illustrates an example of an information recording medium in which a content to which the processing of the present invention is applicable is stored.

[0034]

An information recording medium 100 is an information

recording medium storing authorized content, manufactured in a disk manufacturing plant under permission of a so-called content right holder who has authorized content authoring rights or distribution rights. Note that with the following embodiment, an example of a disc-shaped medium will be described as an example of the information recording medium, but the present invention can be applied to configurations using various forms of information recording media.

[0035]

The information recording medium 100 is a recording medium of various forms, such as for example, a ROM disc to which data rewriting is impossible, a partial ROM disc in which only a part of the data region is rewritable, a disc where data rewriting can be performed for the entire region, and so forth.

[0036]

As shown in Fig. 1, content 101 is stored in the information recording medium 100. This is content 101 made up of, for example, AV (Audio Visual) streams of moving picture content such as HD (High-Definition) movie content which is high definition moving image data, game programs in formats stipulated by particular standards, image files, audio data, text data, and so forth. These contents include various forms of information, such as information usable only by data from the information recording medium 100,

information usable by combining data from the information recording medium 100 and data provided from a server connected to a network, and so forth.

[0037]

The content 101 stored in the information recording medium 100 has at least part thereof stored as encrypted content, and a recording seed (REC SEED) 102 is stored as information necessary for generating a key to be applied to decryption processing of the encrypted content. The encrypted contents are stored in the information recording medium 100 as encrypted data to which a unit key has been applied as an individual encryption key for each, for usage management of the contents. The recording seed (REC SEED): Vu 102 is key generation information to be applied for generating individual unit keys. Note that the recording seed (REC SEED) 102 is not restricted to being stored in the information recording medium 100, and may be obtained from a server connected via network, for example.

[0038]

The information recording medium 100 further stores a disc ID 103 serving as identifier information of the information recording medium 100, a studio ID 104 serving as an identifier of an editing studio of the stored contents of the information recording medium 100, a package ID 105 serving as a package identifier as a manufacturing unit of

the information recording medium 100, and disc type identification information 106.

[0039]

The contents stored in the information recording medium 100 are contents made up of, for example, AV (Audio Visual) streams of moving picture content such as HD (High-Definition) movie content which is high definition moving image data, game programs in formats stipulated by particular standards, image files, audio data, text data, and so forth. In the event that the information recording medium is a Blu-ray disc which is a data recording disc using blue laser which is capable of high-density recording, for example, data following the Blu-ray disc ROM standard format is stored as main contents.

[0040]

Further, there may be cases in which data having data formats not following a particular AV data format, such as game programs serving as service data, image files, audio data, text data, and like contents, are stored as sub-contents.

[0041]

The various contents 101 stored in the information recording medium 100 are each stored in the information recording medium 100 being individually encrypted applying individual unit keys, for usage management of contents. The

recording seed 102 is applied as key generating information for generating unit keys.

[0042]

That is to say, AV (Audio Visual) streams, music data, moving pictures, still images and like image data, game programs, WEB contents, and the like, making up the contents, are sectioned into units which are management units of content usage, with a different recording seed: Vu 102 being applied to each section unit, so that a unit key can be generated based on the recording seed corresponding to each unit, and reproduction is enabled by decryption processing of the encrypted contents applying the unit key.

[0043]

For example, at the time of using contents of an AV (Audio Visual) stream stored in the information recording medium 100, a predetermined encryption key generating sequence is executed applying the recording seed: Vu 102 and, although not shown in the drawings, other secret information such as a physical index recorded in the information recording medium 100 or the like, to obtain a unit key corresponding to the unit, and decryption processing of the encrypted content contained in the unit is performed based on the obtained unit key, and reproduction is performed.

[0044]

As described above, the encrypted contents stored in

the information recording medium 100 are sectioned into units which are content usage management units. These units are called CPS units (content management units). Fig. 2 shows a correlation example of CPS unit configurations with recording seeds. Fig. 2 illustrates the correlation between a CPS unit managing table serving as content management information stored in the information recording medium, and CPS unit keys which can be generated based on the recording seeds corresponding to each unit.

[0045]

As illustrated in the CPS unit management table shown in Fig. 2, there are various setting units of a CPS unit, such as content title, application, data group, and so forth, with a CPS unit ID serving as an identifier corresponding to each CPS unit, recording seed information, and so forth, being correlated with each CPS unit management table.

[0046]

In Fig. 2, Title 1 is CPS unit 1 and Vu1 is set as a corresponding recording seed, Title 2 is CPS unit 1 and Vu1 is set as a corresponding recording seed, and Application 1 is set as CPS unit 2.

[0047]

For example, a unit key Ku1 is generated based on the recording seed Vu1 and decryption processing of the encrypted contents contained in the CPS unit (CPS1) which

can be distinguished by Title 1 and Title 2, by encryption processing applying the unit key Ku1. In the same way, a unit key Ku2 is generated based on the recording seed Vu2 and decryption processing of the encrypted contents contained in one CPS unit (CPS2) which can be distinguished by Application 1 is enabled by encryption processing applying the unit key Ku2. The same holds true for the rest.

[0048]

Note that CPS units are set in the CPS unit management table for new data other than contents stored in the information recording medium, such as data which the user has newly generated, or data obtained externally. These are CPS units which the user can newly define with regard to the new data. The CPS units corresponding to the data fields 121 shown in Fig. 2 are applicable as units for new data.

[0049]

These CPS units are units which can be set as management units for new data which the user has generated or obtained, such as, for example, data obtained by executing contents stored in the information recording medium, such as a program for example, specifically, newly generated data such as partway information or score information of games, auxiliary data corresponding to AV streams which are contents stored in the information recording medium such as screen data obtained from an

external server for example, and so forth. Usage forms of these will be described in detail later.

[0050]

[2. Content Storing Configuration]

The storage format of contents stored in the information recording medium according to the present invention will be described with reference to Fig. 3.

[0051]

As shown in Fig. 3, the information recording medium stores an AV stream of moving picture contents, such as HD (High Definition) movie contents which is high-definition moving picture data for example, as the main content 200, and other data and programs, such as game programs which are service data, image files, audio data, text data, and so forth, for example, are stored as sub-contents 300.

[0052]

The main content 200 is stored following a particular AV format, for example, the Blu-ray disc ROM standard format, as Blu-ray disc ROM standard data, and the sub-contents 300 are stored in an arbitrary format not following the Blu-ray disc ROM standard format, as data other than Blu-ray disc ROM standard data.

[0053]

As shown in Fig. 3, the main content 200 stored following the Blu-ray disc ROM standard format has the

moving picture content (AV stream) as actual content to be reproduced, and has a hierarchical configuration following the Blu-ray disc ROM standard format, which is

- (A) Application 210
- (B) Play section specifying file (playlist) 230
- (C) Clip (content data file) 240.

[0054]

(C) Clip (content data file) 240 has clips 241, 242, and 243, which are each sectioned content data files, with each clip 241 having an AV (Audio-Visual) stream file 261 and clip information file 251.

[0055]

The clip information file 251 is a data file storing attribute information belonging to the AV (Audio-Visual) stream file 261. The AV (Audio-Visual) stream file 261 is, for example, MPEG-TS (Moving Pictures Experts Group-Transport Stream) data, having a data structure in which various types of information, such as images (Video), audio (Audio), caption data, and the like, have been multiplexed. There are also cases in which command information for performing control of a player device at the time of reproduction is multiplexed as well.

[0056]

(B) Play section specifying file (playlist) 230 has multiple play section specifying files (playlists) 231, 232,

and 233. Each of the play section specifying files (playlists) 231, 232, and 233 is a configuration having one or more play items in which one of multiple AV stream data files included in the clip (content data file) 240 has been selected, and the play start point and play end point of a particular data portion of the selected AV stream data file has been selected, so that by selecting one play section specifying file (playlist), a play sequence is determined and a playback is executed following a play item of the play section specifying file (playlist).

[0057]

For example, in the case of selecting the play section specifying file (playlist) 231 and playing the content, the play item 234 correlated with the play section specifying file (playlist) 231 has a play start point a and a play end point b in the clip 241, and also the play item 235 has a play start point c and a play end point d in the clip 241, so selecting the play section specifying file (playlist) 231 to play contents plays the particular data regions a through b and c through d of the AV stream file 261 which is the content contained in the clip 241.

[0058]

The (A) application 210 is set as a layer having a combination of application index files 211 and 212 including content titles presented on the display where content

playing is to be executed and reproduction programs 221 and 222, or a combination of application execution files 213 and 214 such as game contents, WEB contents, and the like, and reproduction programs 223 and 224. The user can determine the object of reproduction by selecting the titles included in the application index files 211 and 212.

[0059]

Each title is correlated with one play program (e.g., movie object) of the play programs 221 through 224, as shown in the drawing and upon the user selecting one title, reproduction processing based on the play program corresponded to the selected title is started. The application index files 211 and 212 indicated as Title 1 and Title 2 in the drawing include title presenting programs which display titles and menus which are automatically reproduced at the time of setting and starting up the information recording medium.

[0060]

The application index files 211 and 212, and the application execution files 213 and 214 may include application resource files used for executing application, in some instances. There are also cases, in which various data files which can be obtained from information recording media or network connection servers, for example image files 225 such as JPEG, PNG, BMP, and so forth, audio files 226

such as PCM compressed audio and the like, various types of data files 227 such as text and databases, are applied as application resource files.

[0061]

The play programs (e.g., movie objects) 221 through 224 are content play processing programs for programmably providing functions necessary for presenting play contents (HD movie contents), such as, in addition to the play section specifying file (playlist) to be reproduced, responses as to operation information relating the content playing processing input from the user, jumping between titles, branching of playback sequences, and so forth. The play programs 221 through 224 permit jumping one to another, with a reproduction program to be actually executed following user inputs or a preset program, and playback contents are selected from the clips 240 by the play section specifying file (playlist) 230 specifying the selected reproduction program, and played.

[0062]

The main content 200 is managed in a hierarchical configuration following the Blu-ray disc ROM standard format, as Blu-ray disc ROM standard data for example, as shown in the drawings, with content management units (CPS units) being set with regard to this hierarchical configuration framework, and usage management of the contents is performed

in increments of the content management units (CPS units). Details of the content management units (CPS units) will be described later.

[0063]

Sub-contents 300 are also stored in the information recording medium along with the main content 200. The sub-contents 300 are contents stored in a certain AV format, e.g., in an arbitrary format not following the Blu-ray disc ROM standard format.

[0064]

The sub-contents 300 are, for example, game programs serving as service data, image files, audio files, text data, and so forth, and a group of multiple data files is set as a data group.

[0065]

Fig. 3 illustrates data group 1, 311 through data group N, 312. These data groups can also be set as usage management object contents, and in the event of being set as usage management object contents, content management units (CPS units) are set in increments of the data groups, so that usage management is performed in increments of data groups.

[0066]

[3. Encryption and Usage Management Configuration for Stored Content]

Next, a content management configuration for sectioning the contents stored in the information recording medium into content management units (CPS units) and realizing usage control differing for each unit, will be described with reference to Fig. 4 and the following drawings.

[0067]

As described earlier with reference to Fig. 2, a unit key is assigned to each content management unit (CPS unit) as a different encryption key. The increment to which one unit key is assigned is a content management unit (CPS unit). Note that a unit key is a key which can be generated based on a recording seed corresponding to the unit.

[0068]

Each of the unit keys are applied to encrypt contents belonging to each unit, and at the time of using the contents, a unit key assigned to each unit is obtained for reproduction. Each unit key can be individually managed, such that for example, a unit key assigned to a certain unit A is set as a key which can be obtained from an information recording medium. Also, a unit key to be assigned to a unit B is a key which can be obtained under the condition of accessing to a server connected with network and the user has executed predetermined procedures, and so on and thus, the obtaining and managing configurations of keys corresponding to the units can have forms independent for

each unit key.

[0069]

The setting form of an increment for assigning one key, i.e., a content management unit (CPS unit), will be described with reference to Fig. 4.

[0070]

First, description will be made regarding the setting configuration of a content management unit (CPS unit) at the main content 200 side.

[0071]

On the main content 200 side, CPS units are set including application index files 211 or 212 including one or more titles, or application execution files 213 or 214, included in the (A) application 210, or the like.

[0072]

The CPS unit 1, 401 shown in Fig. 4 is a unit regarding which application index files, play program files, playlists, and an AV stream file group serving as actual data of the contents, have been set as a single unit.

[0073]

Also, the CPS unit 2, 402 is a unit regarding which an application execution file, a play program file, a playlist, and an AV stream file group serving as actual data of the contents, have been set as a single unit.

[0074]

Also, the CPS unit 3, 403 is a unit configured by an application execution file, a play program file, and various data files which can be obtained from an information recording medium or from a network connection server.

[0075]

These units are individually encrypted with the same keys (CPS unit keys: Keys Ku1, Ku2, and Ku3 in Fig. 4) and stored in the information recording medium.

[0076]

In Fig. 4, the content management unit (CPS unit) 1, 401 and the content management unit (CPS unit) 2, 402 are units configured of higher layer (A) applications and lower layer (B) play section specifying files (playlists) + (C) clips (content data files), and the content management unit (CPS unit) 3, 403 is a unit configured of higher layer (A) applications and various data files which can be obtained from an information recording medium or from a network connection server, i.e., image file 225, audio file 226, data file 227, and so forth, without including the lower layer (B) play section specifying files (playlists) + (C) clips (content data files).

[0077]

The content management unit (CPS unit) 1, 401 includes the Title 1, 211 and title 2, 212, play programs 221 and 222, play lists 231 and 232, and clip 241 and clip 242, and the

AV stream data files 261 and 262 which are the actual data of the contents contained in the two clips 241 and 242 are encrypted applying the unit key: Ku1 which is an encryption key correlated with the content management unit (CPS unit) 1, 401.

[0078]

The content management unit (CPS unit) 2, 402 includes the application file 213 configured of game contents, WEB contents, or the like, play program 223, play list 233, and clip 243, and the AV stream data file 263 which is the actual data of the contents contained in the clip 243 is encrypted applying the unit key: Ku2 which is an encryption key correlated with the content management unit (CPS unit) 2, 402. Further, the application file 213 may also serve as an encrypted file to which the unit key: Ku2 has been applied.

[0079]

The content management unit (CPS unit) 3, 403 is set as a unit including the application files 214 and 215 included in the upper layer (A) application layer, play program 224, and further various data files, for example image files 225 such as JPEG, PNG, BMP, and so forth, audio files 226 such as PCM, compressed audio and the like, various types of data files 227 such as text and databases, which can be obtained from an information recording medium or from a network connection server by the play program 224.

[0080]

The content management unit (CPS unit) 3, 403 is encrypted applying the unit key: Ku3 which is an encryption key correlated with the content management unit (CPS unit) 3, 403.

[0081]

For example, in order for the user to execute an application file or content playing processing correlated with the content management unit 1, 401, there is the need to obtain the unit key: Ku1 by encryption processing applying the recording seed Vu1 set in a manner correlated with the content management unit (CPS unit) 1, 401, and execute the contents decryption processing sequence applying the obtained unit key Ku1, and following execution of the decryption processing, the application program can be executed to play the contents.

[0082]

For example, in order to perform usage processing of application files correlated with the content management unit 3, 403, or image files 225, audio files 226 such as PCM or compressed audio, and various data files 227 such as text and databases and the like, correlated with the reproduction program 224, there is the need to obtain the unit key: Ku3 serving as an encryption key correlated with the content management unit (CPS unit) 3, 403, and execute the

decryption processing, and following execution of the decryption processing, the application program is executed or the various files is executed.

[0083]

A directory configuration example of a directory for storing the contents corresponding to the above-described various types of content management units (CPS units) and management information such as key information will be described with reference to Fig. 5.

[0084]

The directory configuration shown in Fig. 5 is a configuration in which a main content data portion 502, sub-content data portion 503, and a content management data portion 501 corresponding to the main content and sub-contents are set. The BDMV directory shown in the main content data portion 502 is set as a director for holding contents and applications according to the Blu-ray Disc ROM format.

[0085]

The main content following the Blu-ray Disc ROM format has a hierarchical configuration of titles, objects, playlists, clip information, AV streams, and so forth as described earlier with reference to Fig. 3 and Fig. 4, and data files making these up are set in the BDMV director.

[0086]

The Data directory in the sub-contents data portion 503 is set as a directory for holding contents and applications for each group with a format not following the Blu-ray Disc ROM format. The Data Group inf in the sub-contents data portion 503 is a file storing the group information of the sub-contents.

[0087]

The management data portion 501 stores management files correlated with both contents of the main contents and the sub-contents. For example, the CPS unit management table set correlating the CPS unit IDs for each content management unit (CPS unit) and recording seed information shown in Fig. 2 as described above, and further, play control information of contents set corresponding to each unit, and copy control information, are stored.

[0088]

Content play control information and copy control information are set as individual information for each CPS unit. For example, individual content usage control information is set for each CPS unit stored in the information recording medium such as

[CPS unit 1]

Number of copies permitted to recording medium: a times,
number of playbacks permitted: b times, remote playback
permitted/not-permitted: permitted...

[CPS unit 2]

Number of copies permitted to recording medium: 0 times,
number of playbacks permitted: c times, remote playback
permitted/not-permitted: not permitted...

and so on.

[0089]

[4. Management Configuration for Newly Generated Data or
Obtained Data]

As described above, contents stored in the information
recording medium are sectioned into CPS units, and CPS unit
keys serving as encryption keys corresponding to each CPS
unit can be used by obtaining applying recording seeds.

[0090]

Management processing will be described regarding data
other than the content already stored in the information
recording medium, such as data generated following a program
stored in the information recording medium, specifically,
partway data or character data generated by executing a game
program, or data obtained from a server or the like via a
network; of such data newly generated or obtained by some
sort of user processing.

[0091]

Fig. 6 illustrates an example of generating and
obtaining processing of data relating to contents already
stored in the information recording medium.

[0092]

Fig. 6 illustrates an information processing device 600 such as a PC or the like, for example, for executing the reproduction processing of the information recording medium. The information processing device 600 has a control unit 601 having a program execution function such as a CPU for example, which executes content reproduction processing, a data storage unit 602 configured of a hard disk or the like, a recording medium interface 603 for performing data input/output to information recording media, memory 604 configured of ROM and RAM used as program execution regions, parameter storage regions, and the like, and a communication interface 605 for executing communication via a network. Note that the configuration of the information processing device 600 shown in Fig. 6 is a minimal configuration for describing the new data generating and obtaining processing, and that a specific hardware configuration example of an information processing device will be described later.

[0093]

The information processing device 600 reads contents sectioned into CPS units stored in the information recording medium 100 via the recording medium interface 603 from the information recording medium 100, and performs content reproduction processing under the control of the control unit 601.

[0094]

The information recording medium 100 has contents stored therein which have been recorded based on the Blu-ray Disc ROM standard, as described with reference to Fig. 3 and Fig. 4, for example. Each of the contents is sectioned into CPS units and subjected to encryption processing.

[0095]

The information processing device 600 generates CPS unit keys based on the recording seeds corresponding to the CPS units, and reproduces the contents. The contents include, for example, games, various types of programs such as AV stream play programs, AV stream data, and so forth.

[0096]

There are the following two forms in which the information processing device 600 generates or obtains new data based on reading from the information recording medium 100.

[0097]

The first is a case of reading information which is analyzable by the information processing device 600 from the information recording medium 100, and obtaining or generating new data based on the read information. An example is a case in which URL information corresponding to an obtaining target of new data is described in the information recording medium 100, with the information

recording medium 100 obtaining this URL information, accessing a server 611 specified by the URL via a communication IF 605 and network using a browser, and downloading the data such as new contents or the like corresponding to the URL. In addition to downloading contents, there are cases in which new data is generated in the information processing device 600 based on read information from the information recording medium 100.

[0098]

The second is a case with an application program recorded in the information recording medium 100. For example, there are cases in which a program read from the information recording medium 100 is executed at the information processing device 600, a certain server 611 is accessed via the communication IF 605 and network following the program to download the contents, or new data is generated in the information processing device 600 by executing the program.

[0099]

Data generated or obtained by such processing is not data belonging to the CPS units, which are management sections of contents recorded in the information recording medium 100, but with the configuration of the present invention, such new data is managed as data belonging to certain CPS units.

[0100]

Specifically, new data generated or obtained based on contents corresponding to CPS units stored in the information recording medium 100, is managed as data belonging to the same CPS unit. Or, a new CPS unit is separately defined and the new data is managed by the new CPS unit.

[0101]

Fig. 7 illustrates a processing sequence for obtaining new data from an external server, based on the stored contents in the information recording medium. In step S101, the information processing device reads out the contents managed by CPS units from the information recording medium. For example, let us say that contents belonging to a CPS unit A have been read out.

[0102]

The information processing device reads out download data specification information, a URL or the like for example, from the information recording medium, obtains the CPS unit ID serving as an identifier of the CPS unit corresponding to the read contents, and in step S102 sends the data, i.e., the CPS unit ID and the download data specification information, to the server.

[0103]

The server executes authentication processing regarding

whether or not the CPS unit ID has been obtained from an authorized information recording medium, by performing a predetermined authentication sequence, verifies the authenticity of the data request, and in the event that the authenticity has been confirmed, in step S103 the requested download data is transmitted to the information processing device. For example, the download data may be voice-over audio data of an AV stream, caption data, a player program for particular contents, or the like.

[0104]

In step S104, the information processing device stores the download data obtained from the server in an information recording medium, or a storage unit such as a hard disk or the like in the information processing device. In either case, the data is stored and managed as data belonging to the same CPS unit A identified by the CPS unit ID, and is encrypted and stored using the encryption processing applying the CPS unit key $K_u(a)$ generated applying the recording seed $V_u(a)$ set as to the CPS unit A.

[0105]

In the sequence described with reference to Fig. 7, when the information processing device requests download data from the server, the information processing device is set to transmit the CPS unit ID and download data specifying information. This is because the following management is

enabled by transmitting the CPS unit ID.

(1) The server can manage downloaded data for each CPS unit.

(2) In the event that permission/non-permission of downloading, billing processing, etc., are managed for each CPS unit, a CPS unit which has been once enabled to download can start downloading from the next time by only transmitting the CPS unit ID.

(3) In the event that encryption of downloaded data is performed on the information recording medium using a key (unit key) defined for each CPS unit, the CPS unit ID is necessary to perform encryption processing on the server. Secure data transmission can be realized by the server holding the CPS unit key corresponding to the unit ID, and transmitting data encrypted applying the held CPS unit key.

[0106]

Note that in addition to information such as URLs and the like download data specification information may include, for example, the studio ID, package ID, title ID, movie object ID, playlist ID, play section information (time stamps of start point and end point), and so forth, determined in Blu-ray Disc ROM standards and the like, and further, values not determined in Blu-ray Disc ROM standards and the like may also be used as download data specification information. Various types of data can be used as download data specification information, as long as the server side

can identify the download data, such as user ID, user-related information such as billing status, date-and-time information, management data generated on the information processing device side when reproducing contents, such as number of times played, range played, game scores, play path information for multi-stories, and so forth.

[0107]

Next, a specific example of data generated or obtained by the information processing device will be described with reference to Fig. 8 and Fig. 9.

[0108]

Fig. 8 illustrates an example of generating or obtaining a part of data following the Blu-ray Disc ROM standard format as new data. As described earlier with reference to Fig. 3 and Fig. 4, contents stored in the information recording medium following the Blu-ray Disc ROM standard format have a hierarchical configuration, and contents reproduction processing, of an AV stream for example, is enabled with the data and programs in each hierarchical layer being correlated.

[0109]

In the information recording medium 621 shown in Fig. 8, CPS units 1, 2, and 3, correlated with three titles, [Title 1], [Title 2], and [Title 3] is set as contents following the Blu-ray Disc ROM standard format.

[0110]

In the three CPS units, the CPS unit 1 and CPS unit 2 which are correlated with the two titles [Title 1] and [Title 2] store movie objects 1 and 2 as play programs corresponding to the titles, and the user can set the information recording medium in the information processing device and specify either [Title 1] or [Title 2], thereby executing any one of the movie objects 1 and 2 which are play programs, thereby playing the clip files of the sections specified by the playlists, i.e., the AB stream data. However, there is the need to extract the recording seeds corresponding to the respective CPS units from the management data to generate CPS unit keys and decrypt the encrypted data such as the AV streams and the like.

[0111]

However, the CPS unit 3 does not store a movie object 3 serving as a play program corresponding to the title 3, and cannot play the clip file, i.e., the AV stream data contained in the CPS unit accordingly. In this case, the information processing device generates or obtains a movie object 3 as new data 622 by executing generating or obtaining processing of the movie object 3 as a play program corresponding to the Title 3. The generated or obtained movie object 3 is managed as configuration data of the CPS unit 3.

[0112]

Fig. 9 is a diagram illustrating another specific example of data which the information processing device newly generates or obtains.

[0113]

The information processing device 600 reproduces an information recording medium 100 storing contents managed by multiple CPS units.

[0114]

For example, a CPU unit A 640 is a content management unit including a game program, and upon the information processing device 600 executing the game program, new data 641 and 642 such as partway end information of the game, game score information, and the like, is generated. Such data is subjected to processing for setting as configuration data of the CPS unit A 640 at the information processing device 600, and is stored in the information recording medium 100 or a storage unit such as a hard disk or the like in the information processing device 600.

[0115]

Also, the CPS unit B650 is a contents management unit including AV stream contents such as moving pictures or the like of a movie or the like, in which the information processing device 600 obtains new data 651 made up of caption data corresponding to the AV stream content from the

server 611, and performs playing. The obtained caption data 651 is subjected to processing for setting as configuration data of the CPS unit B 650 at the information processing device 600, and is stored in the information recording medium 100 or a storage unit such as a hard disk or the like in the information processing device 600.

[0116]

Note that in either case of processing, a configuration may be made such that a new CPS unit is set for the newly generated or obtained data, and stored in the storage unit in the information recording medium 100 or a hard disk or the like in the information processing device 600 as configuration data of the set new CPS unit. As these CPS units, the CPS units corresponding to new data described earlier with reference to Fig. 2 are set while being correlated with these units. A recording seed Vu corresponding to each CPS unit is stored beforehand in the information recording medium. The CPS unit key is generated by applying the recording seeds and executing a predetermined encryption processing sequence. The generated data or the obtained data is encrypted by applying the generated CPS unit keys, and is stored in the information recording medium 100 or a storage unit such as a hard disk or the like in the information processing device 600.

[0117]

Note that the recoding seed Vu corresponding to newly-set CPS units may be obtained from an external server. However, preferably, predetermined authentication processing should be executed between the server providing the recording seed Vu and the information processing device, to prevent unauthorized recording seeds from being obtained. Now, the recording seed Vu being obtained includes obtaining in increments to management tables such as shown in Fig. 2.

[0118]

Encryption and managing forms of newly generated data or obtained data will be described with reference to Fig. 10.

[0119]

Fig. 10 illustrates an example of a data encryption method in the event of recording, in the information recording medium or externally, data generated or obtained corresponding to playing processing of contents stored in the information recording medium.

[0120]

In Fig. 10, the data region on the left side is data which has already been stored in the information recording medium, i.e., ROM region data 660, and the data region on the right side is new data 670 which is newly generated or obtained data. The newly generated or obtained data is stored in a data-writable region of the information recording medium, or in a hard disk or in external storage

means such as portable memory or the like. Fig. 10 illustrates two examples of CPS unit setting examples with regard to the newly generated or obtained data.

[0121]

(Setting Example 1)

As can be seen from the CPS unit 3, 681, shown in Fig. 10, this is a processing example of integrating the new data 671 into CPS units which have been already set in the information recording medium.

[0122]

The CPS unit 3, 681 is data already stored in the information recording medium, i.e., the CPS unit 3 which has already been set in the data region 660, and is a configuration in which the new data 671 that has been newly generated or obtained is all integrated into the CPS unit 3, 681, to form a single unit. In this case, the new data 671, or data contained in the new data 671, is encrypted using the unit key Ku3 generated applying the recording seed Vu3 set corresponding to the CPS unit 3, and is stored in the information recording medium or a storage unit such as a hard disk.

[0123]

This configuration example is a configuration in which the generated data is encrypted using the same key as the unit key corresponding to the already-defined CPS unit in

the ROM region of the information recording medium, so at the time of playing processing, the same key as that of the data included in the already-defined CPS unit in the ROM region of the information recording medium can be applied to execute decryption processing of the new data 671, thereby enabling seamless reproduction with no need to switch over keys.

[0124]

(Setting Example 2)

As can be seen from the CPS unit 4, 682, shown in Fig. 10, this is a processing example of setting a new CPS unit different from the CPS units which have been already set in the information recording medium, and managing the new data 672 there.

[0125]

Thus, a CPS unit 4, 682, is separately defined for the new data 672, and encryption of data contained in the new data 672 is performed using a unit key corresponding thereto. The CPS unit 4, 682 is independently managed from the data recorded in the information recording medium. In this case, there is the need to separately set and record information, for assigning a CPS unit to the new data 672 and information for generating a unit key, as management information.

[0126]

A setting example of reproduce/copy control information

as management data corresponding to the new data newly generated or obtained, will be described with reference to Fig. 11.

[0127]

Fig. 11 illustrates a directory A corresponding to a CPS management unit configuration stored in the information recording medium 100 beforehand, and a directory B corresponding to new data which has been newly generated or obtained. In the example shown in Fig. 11, various data is set in a [BDMV] directory as contents following the Blu-ray Disc ROM standard format in either case, and various types of management data are stored in the [CPS] directories.

[0128]

For the method for recording the reproduce/copy control information, one of the following two setting examples is applied.

(Setting Example 1)

Existing reproduce/copy control information is applied as the reproduce/copy control information for the new data.

That is, reproduce/copy control information [CPSU nit001. cci] 713 corresponding to the data [01001. m2ts] 715 of the CPS unit 001 previously stored in the information recording medium 100, is applied without change as the reproduce/copy control information corresponding to the newly generated or obtained new data [01003. m2ts] 712, as

shown in Fig. 11. In this case, there is no need to newly generate the reproduce/copy control information corresponding to the new data [01003. m2ts] 712, so the reproduce/copy control information [CPSUnit001. cci] 713 of the CPS unit 001 is set as reproduce/copy control information to be applied to both the existing data [01001. m2ts] 715 and the new data [01003. m2ts] 712.

[0129]

(Setting Example 2)

The reproduce/copy control information of new data is newly generated.

As shown in Fig. 11, this is an example of generating new reproduce/copy control information [CPSUnit002. cci] 714, as reproduce/copy control information corresponding to the new data [01002. m2ts] 711 to form the management data.

[0130]

The case of (Setting Example 1) is a method suitable for the case of downloading and obtaining caption data of language that is not recorded in the ROM region of the information recording medium 100, for example, and reproducing this with the picture and audio data recorded in the ROM region. In this case, it would be natural to perform processing considering both the data recorded in the ROM region and the downloaded data to belong to a single CPS unit.

[0131]

Also, the case of (Setting Example 2) is suitable for enabling data generated by executing an application program read out from the information recording medium 100 to be shared/copied among multiple users. While data recorded in the ROM region, such as execution applications and AV streams, cannot be copied, data generated by executed applications (information such as game score information, map information, or the like, having needs to be sent to other users, or to be checked out to portable devices) can be subjected to reproduction/copy control that differs from that of the ROM region.

[0132]

Fig. 12 is a diagram illustrating a setting example of encryption keys, i.e., recording needs as generating information for unit keys corresponding to each CPS unit.

[0133]

As with the case of Fig. 11, a directory A corresponding to a CPS management unit configuration stored in the information recording medium 100 beforehand, and a directory B corresponding to new data which has been newly generated or obtained, are shown. In the example shown in Fig. 12, in either case, each data is set in a [BDMV] directory as contents following the Blu-ray Disc ROM format, and various types of management data are stored in the [CPS]

directories.

[0134]

As described earlier with reference to Fig. 2, the recording seeds are correlated with CPS unit identifiers (CPS unit IDs) in the CPS unit management table, and thus managed respectively. An encryption key information [Unit_Key_Gen_Value.inf] 721 shown in Fig. 12 is a CPS unit management table stored in the information recording medium 100.

[0135]

As for the setting method of the recording seed corresponding to the CPS unit set corresponding to the new data, either one of the following two setting examples is applied.

[0136]

(Setting Example 1)

A new data recording seed for the new data, which is previously set in the CPS unit management table, is used as the recording seed serving as encryption key generating information for the new data.

This is a configuration, in which a recording seed which has been set in the new data fields 121 (refer to Fig. 2) in the CPS unit management table described earlier with reference to Fig. 2, is used as the recording seed serving as the encryption key generating information for the new

data. The recording seed already set to the new data field 121 (refer to Fig. 2) of the encryption key information [Unit_Key_Gen_Value.inf] 721, which is the management table data stored in the information recording medium 100, is correlated corresponding to the new data [01003.m2ts] 724 in Fig. 12. In this setting example, an already-set recording seed can be applied to the new data field 121 (refer to Fig. 2) while defining a new CPS unit.

[0137]

(Setting Example 2)

A newly generated or obtained recording seed is used as the recording seed serving as encryption key generating information for the new data. In Fig. 12, encryption key information [Unit_Key_Gen_Value.inf] 722 is set as new management table data corresponding to the new data [01002.m2ts] 723, and the newly-set CPS unit identifier as new entry and the generated or obtained recording seed are stored while correlating with each other. Note that in the event that generation of the recording seeds is permitted, the information processing device generates new recording seeds at the data processing unit in the information processing device by generating random numbers, for example. In this setting example, unlimited CPS units can be set and the recording seeds can be generated regarding new data.

[0138]

In the information processing device, when a new CPS unit is set, it is required to correlate the management data, namely the reproduce/copy control information corresponding to the newly-set CPS unit. Accordingly, either one of two methods shown in Fig. 11 described above, i.e., correlating with the existing reproduce/copy control information, or correlating with new reproduce/copy control information upon setting the same is applied.

[0139]

[5. Storing Processing for New Data Generated or Obtained by Information Processing Device]

Next, the storing processing sequence of new data which the information processing device has generated or obtained will be described with reference to the flowchart shown in Fig. 13.

[0140]

The saving target of the new data which the information processing device has generated or obtained is either one of a data writable region set in the information recording medium storing the CPS unit management data, or an external storage region.

[0141]

A storage region external from the information recording medium is, for example, a hard disk built into the information processing device, portable media such as a

memory card, or the like. The storage region in the information recording medium is the processing in the case of applying an information recording medium having a data writeable region, such as a case in which the information recording medium is a Blu-ray disc for example, and is a partial ROM disc having two regions, a reproduction-only region (ROM) and a write-only region.

[0142]

In a case that an information recording medium having a data writable region such as a partial ROM disc is applied, the saving target can be selected from the information recording medium, or from other than the information recording medium. However, in a case that the information recording medium having the data writable region is not applied, the generated data is inevitably saved in the storage region other than the information recording medium.

[0143]

The storing processing sequence of new data which the information processing device has generated or obtained will be described with reference to the flowchart shown in Fig. 13.

[0144]

In step S201, new data is generated or obtained, following data or a program which the information processing device has read from the information recording medium. In

step S 202, whether recording of the data is executed is determined. This determining processing is decided by user input from data input means, for example. Alternatively, automatic determining processing may be executed based on preset information.

[0145]

In the event of not recording data, the processing ends without performing recording processing. In the event of performing data recording, the program proceeds to step S203, and whether the information recording medium mounted on the information processing device is the information recording medium having the data writable region such as the partial ROM disc is determined.

[0146]

In the event that the information recording medium does not have a data writable region, the program proceeds to step S205, and the generated or obtained data is stored in storage means other than the information recording medium, as CPS unit configuration data correlated with that data. Note that in this data storage processing, reproduce/copy control information, and a recording seed in the CPS unit management table, are respectively correlated serving as CPS unit management information corresponding to the stored data. The configuration of this correlation will be described later.

[0147]

In step S203, in the event that the information recording medium mounted on the information processing device is determined to be an information recording medium having a data writable region such as a partial ROM disc, the program proceeds to step S204, and whether data writing is executed to the information recording medium is determined. This is executed as determination processing based on user input information, for example. Alternatively, this may be executed as automatic determination processing based on preset information.

[0148]

In the event that data writing is not executed to the information recording medium, the program proceeds to step S205, and the data is stored in storage means other than the information recording medium, as the data corresponding to the CPS unit correlated with the generated or obtained data.

[0149]

In the event that data writing is executed to the information recording medium, the program proceeds to step S206, and the generated or obtained data is stored in the data writable region of the information recording medium as the data corresponding to the CPS unit. Note that in this data storage processing, reproduce/copy control information, and a recording seed in the CPS unit management table,

serving as CPS unit management information corresponding to the stored data, are respectively correlated.

[0150]

[6. Configuration for Correlating CPS Unit Configuring Data in an Information Recording Medium and CPS Unit Configuring Data Stored Outside of an Information Recording Medium]

As described above, new data which is not stored as original data in the information recording medium storing the contents managed by the CPS units is stored in the information recording medium or in a hard disk or the like. In order to handle this new data as managed data of the CPS management data in the information recording medium, the new data stored in the information recording medium, the hard disk, or the like must be identifiable as managed data of the CPS management data in the information recording medium. A configuration of this identification is described below.

[0151]

Fig. 14 is a diagram illustrating a configuration of correlating new data with a CPS unit in a configuration in which new data is stored in storage means other than the information recording medium having the original CPS units, e.g., a hard disk of the information processing device, for example.

[0152]

In the event that new data is recorded in storage means

other than the information recording medium having the original CPS units, as shown in Fig. 14, the new data corresponding to different information recording mediums 801 and 802 each having CPS units is stored in a single storage means 803 such as a hard disk.

[0153]

In this case, the various types of new data stored in the storage means 803 need to be distinguished in such a manner which data corresponds to the information recording medium 801 and which data corresponds to the information recording medium 802.

[0154]

As described earlier with reference to Fig. 1, the information recording mediums 801 and 802 have stored therein a studio ID serving as an identifier of an editing studio of the stored contents of the information recording medium 100, and a package ID serving as a package identifier as a manufacturing unit of the information recording medium 100.

[0155]

As shown in Fig. 14, the studio ID, package ID, and further CPS unit ID are given to the various new data 804, 805, and 806, stored in the storage means 803, to serve as identification data, with a directory hierarchical structure being set in the order of studio ID, package ID, and CPS

unit ID as shown in the drawing, and data is stored and managed based on this directory hierarchical structure.

[0156]

Generated data can be saved in arbitrary format in the directory assigned to each CPS unit ID. For example, in the event of data generated by an execution application such as Java or the like, it is sufficient for the data to be in a format which can be interpreted by the execution application such as Java at the time of reproduction, and is not bound to any particular format.

[0157]

In the event of stipulating such a directory hierarchy, reference processing performed in the case of calling the data recorded in the storage means other than the information recording medium having the original CPS units from the execution program such as Java or the like can be executed as processing for calling up based on namespace, directory, and file name, as shown in Fig. 15 for example. That is to say, the namespace of the data writing region of the information recording medium having the original CPS units is defined such as [Partial-ROM://], and for the hard disk such as [Local-HDD://], and each storage file for new data can be determined by namespace, directory, and file name, enabling processing such as reading, updating, and rewriting of the file data.

[0158]

Next, the configuration for correlating new data with CPS units in the event of writing new data to the data writable region of an information recording medium having the original CPS units will be described with reference to Fig. 16.

[0159]

In the event of recording new data to the data writable region of an information recording medium having the original CPS units, there is no need for managing the generated data over multiple packages as described with reference to Fig. 14. Accordingly, there is no need for directory management using studio ID and package ID, and as shown in Fig. 16, the new data 811 and 812 are managed as identifiable data by the CPS unit ID.

[0160]

[7. Processing Configuration Restricting Program Execution Conditions]

Next, a configuration will be described for preventing unauthorized content usage and content copying, stipulating that the information recording medium is an information recording medium having the original CPS unit or is a particular type of information recording medium, as conditions for executing a program, such as a Java application program or the like, readable from the

information recording medium storing contents managed by the CPS unit.

[0161]

A processing sequence for program execution under the condition of confirming that the information recording medium is an information recording medium having the original CPS unit will be described with reference to Fig. 17. This processing is processing executed in the information processing device mounted with an information recording medium storing contents managed by the CPS unit.

[0162]

In step S301, the information processing device to which the information recording medium storing the contents managed by the CPS unit has been mounted activates the program read out from the information recording medium, and in step S302, it executes disc type determination as program execution condition confirmation processing. This is executed based on disc type identification information 106 (refer to Fig. 1) recorded in the physical region of the information recording medium, for example.

[0163]

In step S303, whether the disc type is a partial ROM is determined. In the event that the disc type is not the partial ROM, the program proceeds to step S306, and execution of the program is cancelled and the processing

ends.

[0164]

In the event that the disc type is the partial ROM, the program proceeds to step S304, and the program is executed. After confirming the ending of the program in step S305, the program ends the processing.

[0165]

Fig. 18 is a diagram for describing an example of execution permitted/not-permitted settings for a program corresponding to specific information recording medium type.

[0166]

The information processing device obtains disc type identification information of an information recording medium from the physical region of the mounted information recording medium 820. This type information includes information indicating the disc type, such as a data writable RW disc, an R disc, and so forth, data writable RW disc as the partial ROM disc, for example.

[0167]

At the time of starting execution of a program (for example, Java) read from the information recording medium 820, the information processing device determines the type of the information recording medium 820, and only in the event that the type is the partial ROM, the information processing device permits execution of the program, while

canceling execution of the program in the event that the disc is another RW disc or the R disc or the like.

[0168]

Due to this processing, in the event that a partial ROM 821 is mounted in the information processing device as shown in the drawing, programs read from the partial ROM 821 are executed, but in the event that the disc is another RW disc 822 or an R disc 823, execution of the read out program is not permitted, even if the same program has been written therein.

[0169]

Accordingly, in the event that the information recording medium having the original CPS unit is the partial ROM 821, the program execution is not permitted even when the data copying is executed and an RW disc 822 or the R disc 823 generated, and the usage of copied contents can be prevented.

[0170]

Incidentally, while the above-described processing example is an example for determining whether execution of programs is permitted based on the type of the information recording medium, the configuration may also be made such that the target for writing new data is restricted. Further, in the above-described example, the processing is described as processing of a case in which a partial ROM disc is

applied, however, the same processing can also be performed in a case of applying a ROM disc.

[0171]

In the event that the information recording medium is a partial ROM, the new data can be written to the data writable region of the partial ROM, but in the event of executing a program read out from the partial ROM, the write target of the new data such as data generated or data obtained based on the execution of the program is stipulated by the program. That is to say, the write target of the data generated or obtained based on execution of the program read out from the partial ROM is restricted to only the data write region of the same partial ROM. This is realized by setting write target conditions to the program. Due to such a configuration, usage restriction of data which the user has newly generated or obtained can also be realized.

[0172]

[8. Configuration Example of Information Processing Device]

Next, a configuration example of an information processing device for performing reproducing and recording processing on the information recording medium storing contents managed by the above-described CPS units will be described, referring to Fig. 19.

[0173]

An information processing device 900 shown in Fig. 19

drives an information recording medium 910, and has a drive 909 for performing input/output of data recording/playing signals, a CPU 907 serving as control means for executing data processing following various programs, a ROM 906 and memory 908 serving as storage region for programs, parameters, and the like, an input/output I/F 902 for inputting/outputting the digital signals, an input/output I/F 903 for inputting/outputting analog signals and having an A/D, D/A converter 904, an MPEG codec 921 for encoding and decoding MPEG data, TS·PS processing means 922 for executing TS (Transport Stream)·PS (Program Stream) processing, encryption processing means 905 for executing various types of encryption processing, and storage means 930 such as a hard disk, with each of the blocks being connected to a bus 901.

[0174]

In the information processing device 900, in the event of reproducing AV stream data made up of MPEG-TS data from the information recording medium 910, data read out from the information recording medium 910 at the drive 909 is decrypted as necessary at the encryption processing means 905 and separated into various data of video, audio, captions, and so forth, by the TS·PS processing means 922.

[0175]

Further, the digital data decoded at the MPEG codec 921

is converted into analog signals by the D/A converter 904 in the input/output I/F 903 and output. Also, in the event of performing digital output, the MPEG-TS data decrypted at the encryption processing means 905 is output as digital data via the input/output IF 902. Output in this case is performed to a digital interface such as for example, IEEE 1394, an Ethernet cable, a wireless LAN, or the like. In the event of handling network connection functions, the input/output I/F 902 has the functions of network connection.

[0176]

Also, in the event of performing data conversion in the information processing device 900 into a format which the output destination device can receive, the rate conversion and codec conversion processing are added to the video, audio, captions, and so forth, which are once separated at the TS·PS processing means 922, and the data that is multiplexed into an MPEG-TS or an MPEG-PS at the TS·PS processing means 922 again is output from the digital input/output I/F 902. Alternatively, conversion into multiplexed files with codecs other than MPEG may be performed under control of the CPU 907, and output from the digital input/output I/F 902.

[0177]

The CPS unit management table (refer to Fig. 2) serving as CPS unit management information, and management data such

as reproduce/copy control information corresponding to CPS units and so forth, are read out from the information recording medium 910 and then held in the memory 908. Key information for each CPS unit necessary for performing playback can be obtained from data held in the memory.

[0178]

Next, the actions of the information processing device 900 at the time of recording data which is new data such as generated data or obtained data, will be described. Two cases can be conceived for data to be recorded; digital signal input, and analog signal input. In the case of digital signal input, data input from the digital signal input/output I/F 902, and subjected to appropriate encryption processing by the encryption processing means 905 as necessary, is saved in the recording medium 910.

[0179]

Also, in the event of converting the data format of the input digital signals for saving, conversion is made into the saving data format by the MPEG codec 921, CPU907, and TS·PS processing means 922, and thereafter, subjected to appropriate encryption processing by the encryption processing means 905 and saved in the recording medium 910. In the event of analog signals, analog signals input to the input/output I/F 903 are converted into digital signals by the A/D converter 904, and converted into a codec used by

the MPEG codec 921 at the time of recording.

[0180]

Subsequently, conversion is made by the TS·PS processing means into AV multiplexed data which is the format of recorded data, and then subjected to appropriate encryption processing by the encryption processing means 905 as necessary and saved in the recording medium 910. Note that content management information is also created at the time of recording, and saved in the recording medium 910.

[0181]

In the event of obtaining necessary information via external network with the information processing device 900, the obtained data is saved in the memory 908 in the information processing device 900. Saved information includes key information necessary for reproducing contents, data such as captions to be reproduced together at the time of reproducing contents, audio, still images and the like, contents managing information, usage rules for the reproducing device corresponding to content management information, and so forth.

[0182]

Note that programs for executing reproducing processing and recording processing are held in the ROM 906, and the memory 908 is used as necessary for saving data while processing.

[0183]

Generating, obtaining, and recording processing of new data will be described. Execution programs or analyzable data is read from the information recording medium 910 in the drive 909, and held in the memory 908, and the program is executed, or the data is analyzed, under control of the CPU 907.

[0184]

Data newly generated or obtained is temporarily held in the memory 908, and is stored in the information recording medium 910 or storage means 930 such as a hard disk or the like, following user selection or a predetermined control sequence.

[0185]

Note that programs for executing the reproducing processing and recording processing are held in the ROM 906, and during execution processing of the programs, the memory 908 is used as necessary for holding parameters and data, and as a work region. While Fig. 19 has been described with regard to a device configuration capable of recording and reproducing data, a configuration may be made with a device only with reproduction functions or a device only with recording functions, and the present invention is applicable to these devices as well.

[0186]

The present invention has been described in detail with reference to particular embodiments. However, it is self-evident that one skilled in the art can make various modifications and substitutions to the embodiments without departing from the essence of the present invention. That is to say, the present invention has been disclosed in exemplary form, and should not be interpreted restrictively. Determination of the essence of the present invention should be made based on the Claims laid forth at the beginning.

[0187]

The series of processing described in the description herein can be executed with a configuration of hardware, or software, or a combination thereof. In the case of executing processing with software, a program storing the processing sequence can be installed into the memory of the computer built into dedicated hardware and executed, or a program can be installed into a general-use computer, in which various types of processing can be executed, and executed.

[0188]

For example, the program can be recorded in advance on a hard disk or in ROM (Read Only Memory) serving as a recording medium. Alternatively, the program can be stored (recorded) temporarily or permanently onto a removable recording medium such as a flexible disk, a CD-ROM (Compact

Disc Read Only Memory), an MO (Magneto optical) disk, a DVD (Digital Versatile Disc), a magnetic disk, or a semiconductor memory. Such removable recording media can be provided as so-called packaged software.

[0189]

Besides installing the program on the computer from the above-described removable recording media, the program can be wirelessly transferred to the computer from a download site, or can be transferred via cable to the computer via a network such as a LAN (Local Area Network) or the Internet, and the computer can receive the program transferred in such a manner and install the program onto a recording medium such as an internal hard disk.

[0190]

The various processing described in the description herein may not only be executed in time sequence according to the description, but also be executed in parallel or individually according to the processing capability of the device to execute the processing, or as needed. Also, system in the present specification refers to a logical group configuration of multiple devices, and is not limited to the various configurations being in one enclosed unit.

[Industrial Applicability]

[0191]

As described above, according to the configuration of

the present invention, new data such as information which a user has generated or information which has been downloaded newly in relation to content information in increments of content management units stored in an information recording medium, in the form of encrypted data to which a unit key corresponding to a content management unit or a unit key corresponding to a new content management unit has been applied, as content management unit configuration data, so secure data management and usage management are realized for newly-generated data in the same way as with the original unit correlated data. Accordingly, applying the configuration of the present invention in a configuration in which generating or obtaining of new data is performed enables usage management of new data to be effectively performed.

[0192]

Further, according to the configuration of the present invention, in execution of a program included in information read from an information recording medium, the type of the information recording medium from which the program has been read is determined, and the program is executed under the condition of confirming that the type is a type in which the execution of the preset program is permitted, so execution of the program using a copied disk of the content will be rejected for example, and unauthorized usage of the contents

can be prevented.

[Brief Description of the Drawings]

[0193]

[Fig. 1] Fig. 1 is a diagram for describing the configuration of data stored in an information recording medium.

[Fig. 2] Fig. 2 is a diagram illustrating an example of a CPS unit management table.

[Fig. 3] Fig. 3 is a diagram for describing a setting example of content management units set with regard to content stored in the information recording medium.

[Fig. 4] Fig. 4 is a diagram for describing an encryption configuration example of the content management units set with regard to the content stored in the information recording medium.

[Fig. 5] Fig. 5 is a diagram for describing a configuration example of a data storage directory in the information recording medium.

[Fig. 6] Fig. 6 is a diagram for describing processing for generating or obtaining new data in an information processing device to which the information recording medium has been mounted.

[Fig. 7] Fig. 7 is a diagram for describing a new data obtaining processing sequence with the information processing device.

[Fig. 8] Fig. 8 is a diagram for describing an example of new data generated or obtained with the information processing device.

[Fig. 9] Fig. 9 is a diagram for describing an example of new data generated or obtained with the information processing device.

[Fig. 10] Fig. 10 is a diagram for describing the relation between new data generated or obtained, and CPS units, with the information processing device.

[Fig. 11] Fig. 11 is a diagram for describing a setting example of reproduction/copy control information of new data generated or obtained with the information processing device.

[Fig. 12] Fig. 12 is a diagram for describing a setting example of encryption key information for new data generated or obtained with the information processing device.

[Fig. 13] Fig. 13 is a flowchart for describing a write processing sequence of new data generated or obtained with the information processing device.

[Fig. 14] Fig. 14 is a diagram for describing a configuration for identifying generated or obtained new data as a CPS unit with the information processing device.

[Fig. 15] Fig. 15 is a diagram for describing a configuration for identifying and obtaining generated or obtained new data as a CPS unit with the information

processing device.

[Fig. 16] Fig. 16 is a diagram for describing a configuration for identifying generated or obtained new data as a CPS unit with the information processing device.

[Fig. 17] Fig. 17 is a flowchart for describing a processing sequence for restricting execution of a program based on the type of information recording medium.

[Fig. 18] Fig. 18 is a diagram for describing a specific example of processing for restricting execution of the program based on the type of information recording medium.

[Fig. 19] Fig. 19 is a diagram for describing a configuration example of the information processing device executing reproduction processing or recording processing by mounting the information recording medium.

[Reference Numerals]

[0194]

100: information recording medium

101: content

102: recording seed

103: disc ID

104: studio ID

105: package ID

106: disc type identification information

200: main content

210: application
211, 212: application index file (title)
213, 214, 215: application execution file
221-224: reproduction program
230: Play section specifying file (playlist)
231-233: play list
234, 235: play item
240: clip (content data file)
241-243: clip
251: clip information
261, 262, 263: AV stream
300: sub-contents
311, 312: data group
401-405: content management unit (CPS unit)
501: content management data portion
502: main content data portion
503: sub-content data portion
600: information processing device
601: control unit
602: data storage unit
603: recording medium interface
604: memory
605: communication interface
611: server
621: information recording medium

622: new data
640: CPU unit A
641, 642: new data
650: CPS unit B
651: new data
660: ROM region
670: new data
671, 672: new data
681, 682: CPS unit
711, 712: new data
713, 714: reproduce/copy control information
721, 722: encryption key information
723, 724: new data
801, 802: information recording medium
803: storage means
804, 805, 806: new data
811, 812: new data
820: information recording medium
821: partial ROM disc
822: RW disc
823: R disc
900: information processing device
901: bus
902: input/output I/F
903: input/output I/F

904: A/D, D/A converter
905: encryption processing means
906: ROM
907: CPU
908: memory
909: drive
910: information recording medium
921: MPEG codec
922: TS·PS processing means
930: storage means

[Name of Document] ABSTRACT

[Abstract]

[Object] To provide a configuration that enables usage management and secure data management of data that are newly generated or obtained, and that are different from data already stored in an information recording medium.

[Solving Means] New data such as information which the user has newly generated or downloaded related to content information increments of content management information stored in an information recording medium is recorded as configuration data of the content management unit, in the form of encrypted data to which a unit key corresponding to the content management unit, or a unit key corresponding to a new content management unit, has been applied. According to this configuration, secure data management and usage management similar to data corresponding to original units are realized for new data as well.

[Selected Figure] Fig. 10

[Name of Document] Drawings

Fig. 1

101: CONTENT (ENCRYPTED CONTENT)
102: RECORDING SEED: Vu (REC SEED)
103: DISC ID
104: STUDIO ID
105: PACKAGE ID
106: DISC TYPE ID INFORMATION

Fig. 2

a: MANAGING TABLE
b: CONTENT MANAGING UNIT (CPS) SETTING INCREMENT
c: TITLE 1
d: TITLE 2
e: APPLICATION 1
f: APPLICATION 2
g: DATA GROUP 1
h: DATA GROUP 2
i: NEW DATA 1
j: NEW DATA 2
k: CONTENT MANAGING UNIT IDENTIFIER (CPS UNIT ID)
l: RECORDING SEED: Vu (KEW FOR CPS UNIT)
m: CPS UNIT KEYS CAPABLE OF BEING GENERATED
n: CPS UNIT KEY

Fig. 3

(A): APPLICATION ("INDEX" OR "APPLICATION + PLAY PROGRAM" OR
"DATA GROUP")

211: TITLE 1

212: TITLE 2

213: APPLICATION 1

214: APPLICATION 2

221: PLAY PROGRAM (MOVIE OBJECT)

222: PLAY PROGRAM (MOVIE OBJECT)

223: PLAY PROGRAM (OBJECT)

224: PLAY PROGRAM (OBJECT)

225: IMAGE FILE (JPEG, PNG, BMP, ETC.)

226: AUDIO FILE (PCM, COMPRESSED AUDIO)

227: DATA FILE (TEXT, DATABASE, ETC.)

(B): PLAY SECTION SPECIFYING FILE (PLAY LIST)

a: PLAY LIST

b: PLAY ITEM

c: PLAY LIST

d: PLAY ITEM, PLAY ITEM

e: PLAY LIST

f: PLAY ITEM

251: CLIP INFORMATION

(C): CLIP (CONTENT DATA FILE)

g: AV STREAM

h: + COMMAND

i: AV STREAM
j: + COMMAND
k: AV STREAM
l: + COMMAND
m: DATA GROUP 1
n: FILE 1
o: FILE 2
p: DATA GROUP N
q: FILE N1
r: FILE N2
200: MAIN CONTENT (BLUE-RAY DISK STANDARD DATA)
300: SUB-CONTENT (DATA OTHER THAN BLUE-RAY DISK ROM
STANDARD)
s: CLIP INFORMATION
t: CLIP INFORMATION

Fig. 4

211: TITLE 1
212: TITLE 2
213: APPLICATION 1
214: APPLICATION 2
221: PLAY PROGRAM (MOVIE OBJECT)
222: PLAY PROGRAM (MOVIE OBJECT)
223: PLAY PROGRAM (MOVIE OBJECT)
224: PLAY PROGRAM (MOVIE OBJECT)

225: IMAGE FILE (JPEG, PNG, BMP, ETC.)
226: AUDIO FILE (PCM, COMPRESSED AUDIO)
227: DATA FILE (TEXT, DATABASE, ETC.)
200: MAIN CONTENT (BLUE-RAY DISK STANDARD DATA)
300: SUB-CONTENT (DATA OTHER THAN BLUE-RAY DISK ROM
STANDARD)
a: PLAY ITEM
b: 401 CPS UNIT 1 [ENCRYPTED WITH Ku1]
c: PLAY LIST
d: PLAY ITEM
e: PLAY ITEM
251: CLIP INFORMATION
f: CLIP INFORMATION
g: AM STREAM
h: + COMMAND
i: CLIP INFORMATION
j: AV STREAM
k: + COMMAND
l: DATA GROUP 1
m: FILE 1
n: FILE 2
o: DATA GROUP N
p: FILE N1
q: FILE N2
r: 404 CPS UNIT 4 [ENCRYPTED WITH Ku4]

s: 405 CPS UNIT 5 [ENCRYPTED WITH Ku5]
t: 403 CPS UNIT 3 [ENCRYPTED WITH Ku3]
u: 402 CPS UNIT 2 [ENCRYPTED WITH Ku2]
v: PLAY ITEM

Fig. 5

a: PLAY/COPY CONTROL INFORMATION FOR EACH CPS UNIT
b: TITLE INDEX
c: MOVIE OBJECT
d: PLAY LIST FILE
e: CLIP INFORMATION FILE
f: CLIP AV STREAM
g: SUB-CONTENT GROUPING INFORMATION

Fig. 6

600: INFORMATION PROCESSING DEVICE
601: CONTROL UNIT (PLAY CONTENT/EXECUTE PROGRAM)
602: DATA STORAGE UNIT
603: RECORDING MEDIUM IF
604: MEMORY
605: COMMUNICATION IF
611: SERVER
a: NETWORK
b: SERVER

Fig. 7

a: INFORMATION PROCESSING DEVICE

b: CPS UNIT A

c: CPS UNIT A

d: DOWNLOAD DATA

e: STORE DOWNLOAD DATA

f: SERVER

S101: CPS UNIT ID DOWNLOAD DATA SPECIFYING INFORMATION

S102: CPS UNIT ID DOWNLOAD DATA SPECIFYING INFORMATION

S103: DOWNLOAD DATA

S104: STORE DOWNLOAD DATA

Fig. 8

a: INFORMATION RECORDING MEDIUM

b: TITLE 1

c: PLAY PROGRAM (MOVIE OBJECT 1)

d: TITLE 2

e: PLAY PROGRAM (MOVIE OBJECT 2)

f: TITLE 3

g: PLAY PROGRAM (MOVIE OBJECT 3)

h: • DOWNLOAD CONTENT, OR INFORMATION GENERATED BY EXECUTING
PROGRAM

• GENERATED MOVIE OBJECT IS MANAGED BY SAME CPS UNIT AS
RELATED CONTENT STORED IN INFORMATION RECORDING MEDIUM

Fig. 9

650: CPS UNIT B
640: CPS UNIT A
641: GAME PREMATURE-END INFORMATION
642: GAME SCORE INFORMATION
651: CAPTION DATA
611: SERVER
a: OBTAINED INFORMATION
b: GENERATED INFORMATION
c: NETWORK

Fig. 10

a: ROM REGION (BLUE-RAY DISK ROM STANDARD DATA)
b: NEW DATA (RECORDED IN DISC OR EXTERNALLY FROM DISC)
211: TITLE 1
212: TITLE 2
213: APPLICATION 1
214: APPLICATION 2
225: IMAGE FILE (JPEG, PNG, BMP, ETC.)
221: PLAY PROGRAM (MOVIE OBJECT)
222: PLAY PROGRAM (MOVIE OBJECT)
223: PLAY PROGRAM (MOVIE OBJECT)
224: PLAY PROGRAM (MOVIE OBJECT)
226: AUDIO FILE (PCM, COMPRESSED AUDIO)
227: DATA FILE (TEXT, DATABASE, ETC.)

231: PLAY LIST
232: PLAY LIST
233: PLAY LIST
c: PLAY ITEM
d: PLAY ITEM
e: PLAY ITEM
f: 401 CPS UNIT 1 [ENCRYPTED WITH Ku1]
251: CLIP INFORMATION
g: AV STREAM
h: + COMMAND
i: CLIP INFORMATION
j: AV STREAM
k: + COMMAND
l: CLIP INFORMATION
m: AV STREAM
n: + COMMAND
o: 402 CPS UNIT 2 [ENCRYPTED WITH Ku2]
p: DATA GENERATED CORRESPONDING TO CPS UNIT 2
q: FILE 2A
r: FILE 2B
t: NEW DATA 671
u: DATA GENERATED CORRESPONDING TO CPS UNIT 3
v: FILE 3A
w: FILE 3B
x: NEW DATA 672

y: 681 UNIT 3 [ENCRYPTED WITH Ku3]
 z: (SETTING EXAMPLE 1) INCLUDE IN SAME CPS UNIT AS DEFINED
 IN ROM REGION, AND ENCRYPT WITH COMMON UNIT KEY
 A: 682 UNIT 4 [ENCRYPTED WITH Ku4]
 B: (SETTING EXAMPLE 2) INCLUDE IN CPS UNIT DEFINED
 SEPARATELY FOR GENERATED DATA, AND ENCRYPT WITH INDIVIDUAL
 UNIT KEY

Fig. 11

a: ROM REGION ON INFORMATION RECORDING MEDIA
 b: INFORMATION RECORDING MEDIA, OR OTHER RECORDING REGION
 c: (SETTING EXAMPLE 1) APPLY REPRODUCE/COPY CONTROL
 INFORMATION DEFINED IN ROM REGION
 d: (SETTING EXAMPLE 2) APPLY REPRODUCE/COPY CONTROL
 INFORMATION DEFINED SEPARATELY FOR GENERATED DATA

Fig. 12

a: ROM REGION ON INFORMATION RECORDING MEDIA
 b: RECORDING SEED Vu1, Vu2
 c: (SETTING EXAMPLE 1) USE CPS UNIT ENCRYPTION KEY Ku2
 (GENERATED BASED ON RECORDING SEED Vu2) DEFINED IN RESERVE
 d: INFORMATION RECORDING MEDIA, OR OTHER RECORDING REGION
 e: RECORDING SEED Vu3
 f: (SETTING EXAMPLE 2) USE ENCRYPTION KEY Ku3 (GENERATED
 BASED ON RECORDING SEED Vu3 DOWNLOADED OR NEWLY GENERATED)

Fig. 13

S201: GENERATE OR OBTAIN DATA

S202: RECORD DATA?

S203: DATA-WRITABLE INFORMATION RECORDING MEDIUM (PARTIAL
ROM DISC)?

S204: RECORD IN DISC?

S205: RECORD IN STORAGE MEANS OTHER THAN DISC, AS DATA
CORRESPONDING TO CPS UNIT

S206: RECORD IN WRITABLE REGION OF PARTIAL ROM, AS DATA
CORRESPONDING TO CPS UNIT

S207: WRITING ENDED?

Fig. 14

a: INFORMATION RECORDING MEDIUM

b: STUDIO ID = 002

c: PACKAGE ID = 123

d: CPS UNIT ID = 001

e: CPS UNIT ID = 002

f: INFORMATION RECORDING MEDIUM

g: STUDIO ID = XXX

h: PACKAGE ID = YYY

i: CPS UNIT ID = 001

j: CPS UNIT ID = 002

k: CORRELATION

l: CORRELATION
m: STORAGE MEANS
n: STUDIO ID = 002
o: PACKAGE ID = 123
p: STUDIO ID = 002
q: PACKAGE ID = 123
r: CPS UNIT ID = 002
s: STUDIO ID = XXX
t: PACKAGE ID = YYY
u: CPS UNIT ID = 001
v: NEW DATA
w: CPS UNIT ID = 001

Fig. 15

a: DEFINE NAME SPACE OF RECORDING TARGET
b: WRITABLE REGION OF PARTIAL ROM
c: DIRECTORY NAME
d: FILE NAME

Fig. 16

a: INFORMATION RECORDING MEDIUM ROM REGION
b: STUDIO ID = XXX
c: PACKAGE ID = YYY
d: CPS UNIT ID = 001
e: CPS UNIT ID = 002

f: DATA RECORDABLE REGION ON INFORMATION RECORDING MEIDUM c
g: NEW DATA
h: CPS UNIT ID = 001
i: CPS UNIT ID = 001

Fig. 17

S301: START UP PROGRAM READ FROM DISK
S302: EXECUTE DISK TYPE DETERMINATION AS PROGRAM EXECUTION
CONDITION CONFIRMATION PROCESSING
S303: IS DISK TYPE PARTIAL ROM?
S304: EXECUTE PROGRAM
S305: PROGRAM ENDED?
S306: END PROGRAM

Fig. 18

a: APPLICATION RESTRICTING RECORDING TO WRITABLE REGION
INSIDE PARTIAL ROM DISC
b: WRITABLE REGION
c: JAVA APPLICATION
d: GENERATED DATA
e: APPLICATION PROGRAM EXECUTION CONDITINS BY DISC TYPE
f: EXECUTION CONDITION: PARTIAL ROM
g: JAVA APPLICATION
h: CANNOT EXECUTE
i: UNAUTHORIZED COPIED RW DISC

j: JAVA APPLICATION

k: CANNOT EXECUTE

l: UNAUTHORIZED COPIED R DISC

Fig. 19

a: DIGITAL SIGNALS

b: NETWORK CONNECTION

c: ANALOG SIGNALS

902: INPUT/OUTPUT I/F

903: INPUT/OUTPUT I/F

904: A/D, D/A CONVERTER

905: ENCRYPTION MEANS (EX. ENCRYPTION LSI)

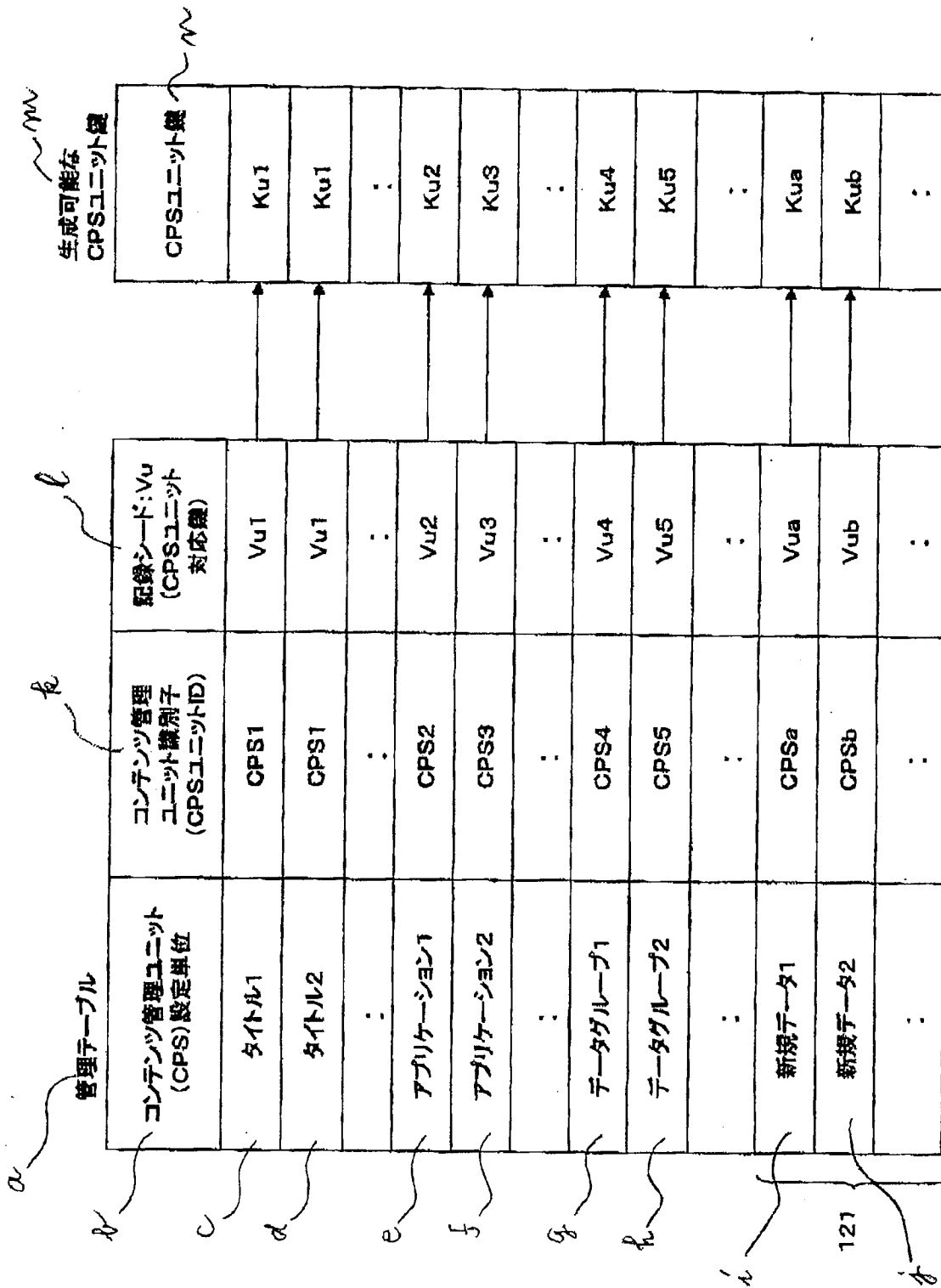
921: MPEG CODEC

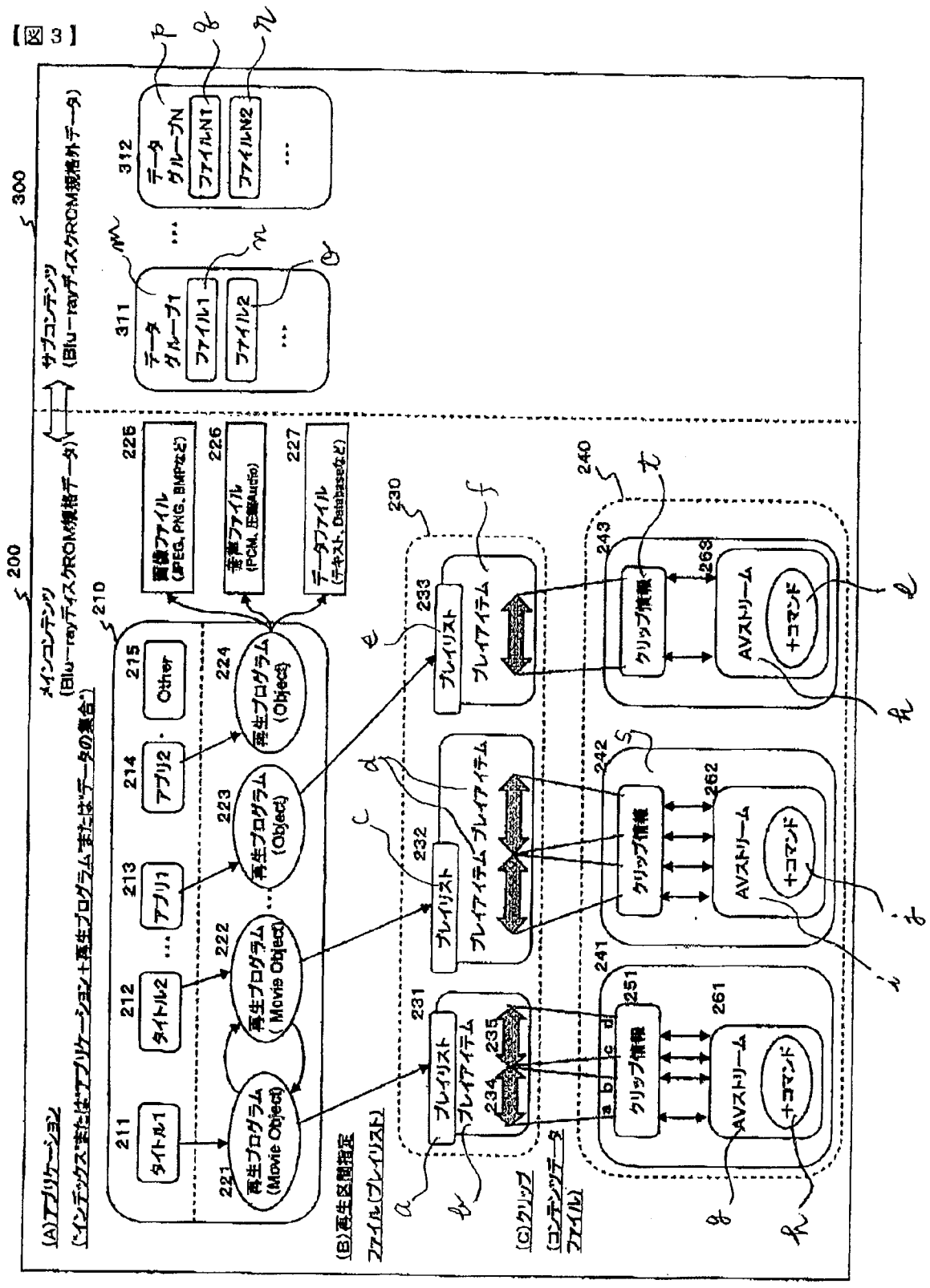
922: TS-PS PROCESSING MEANS

910: RECORDING MEDIUM

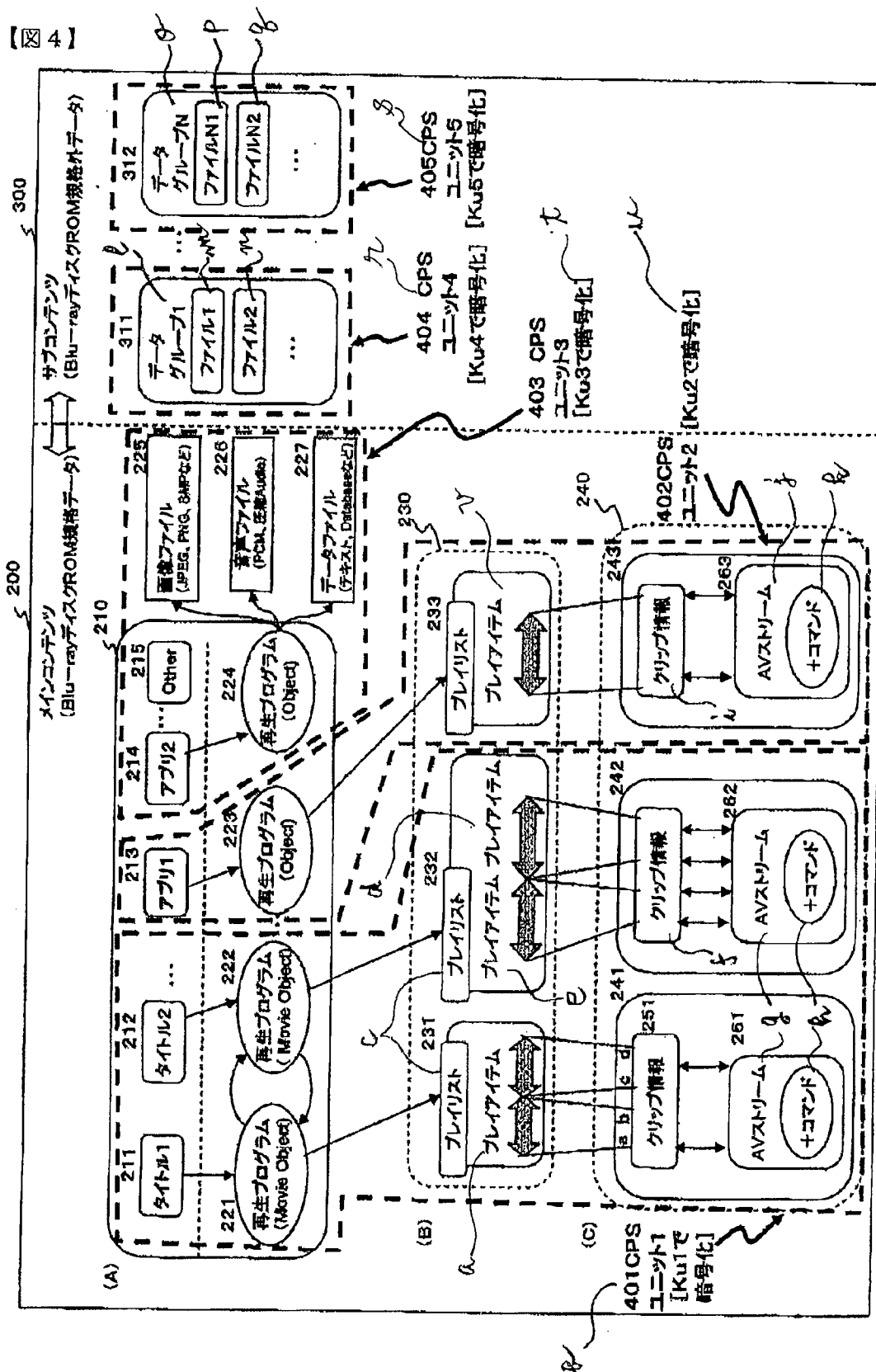
930: STORAGE MEANS

【図2】

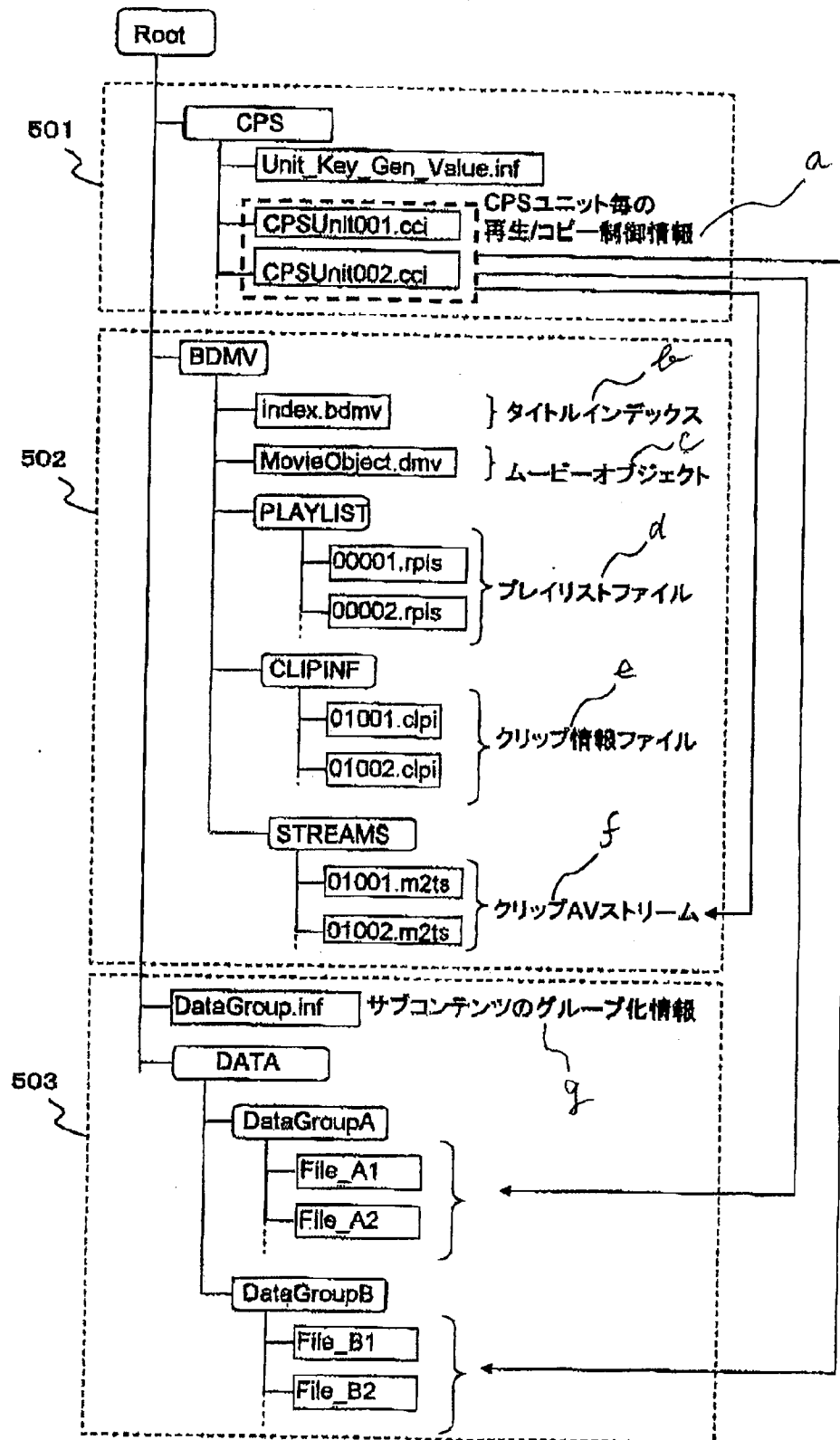




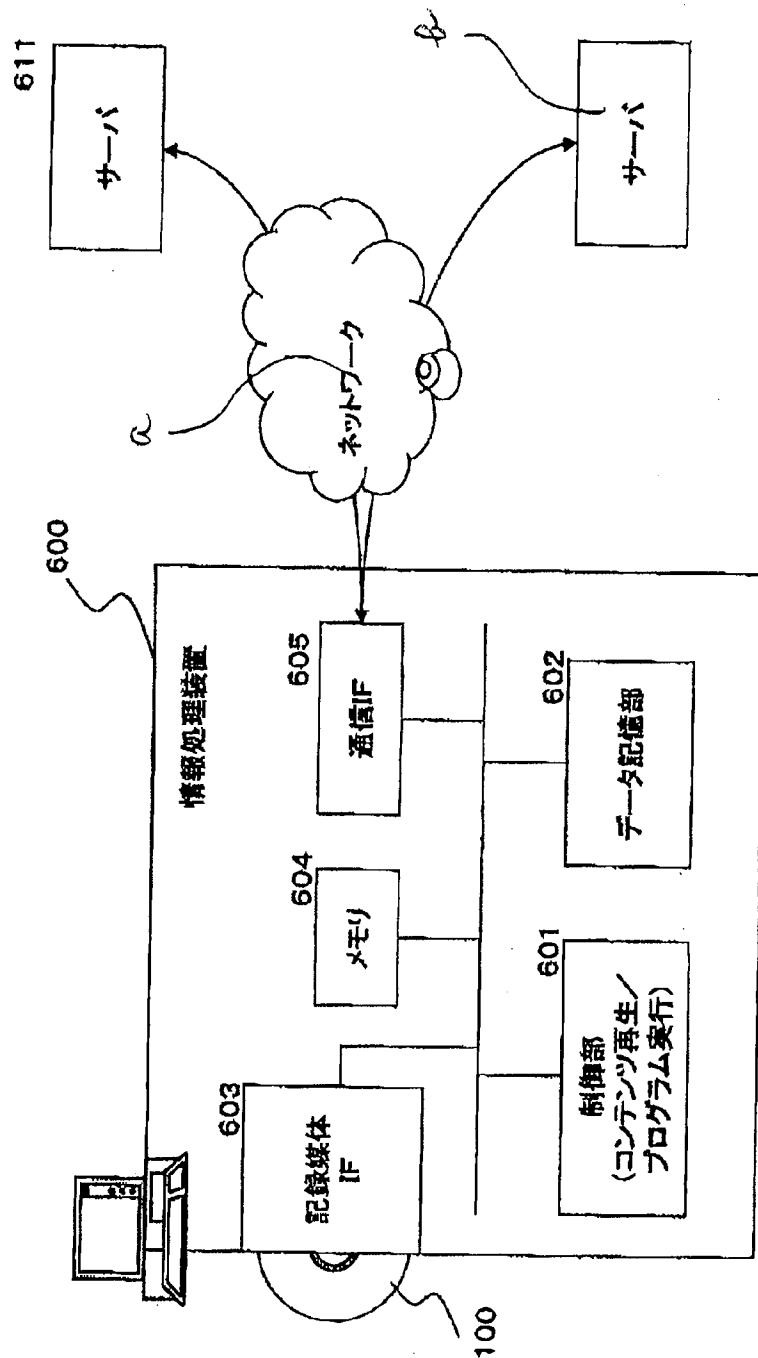
【図4】



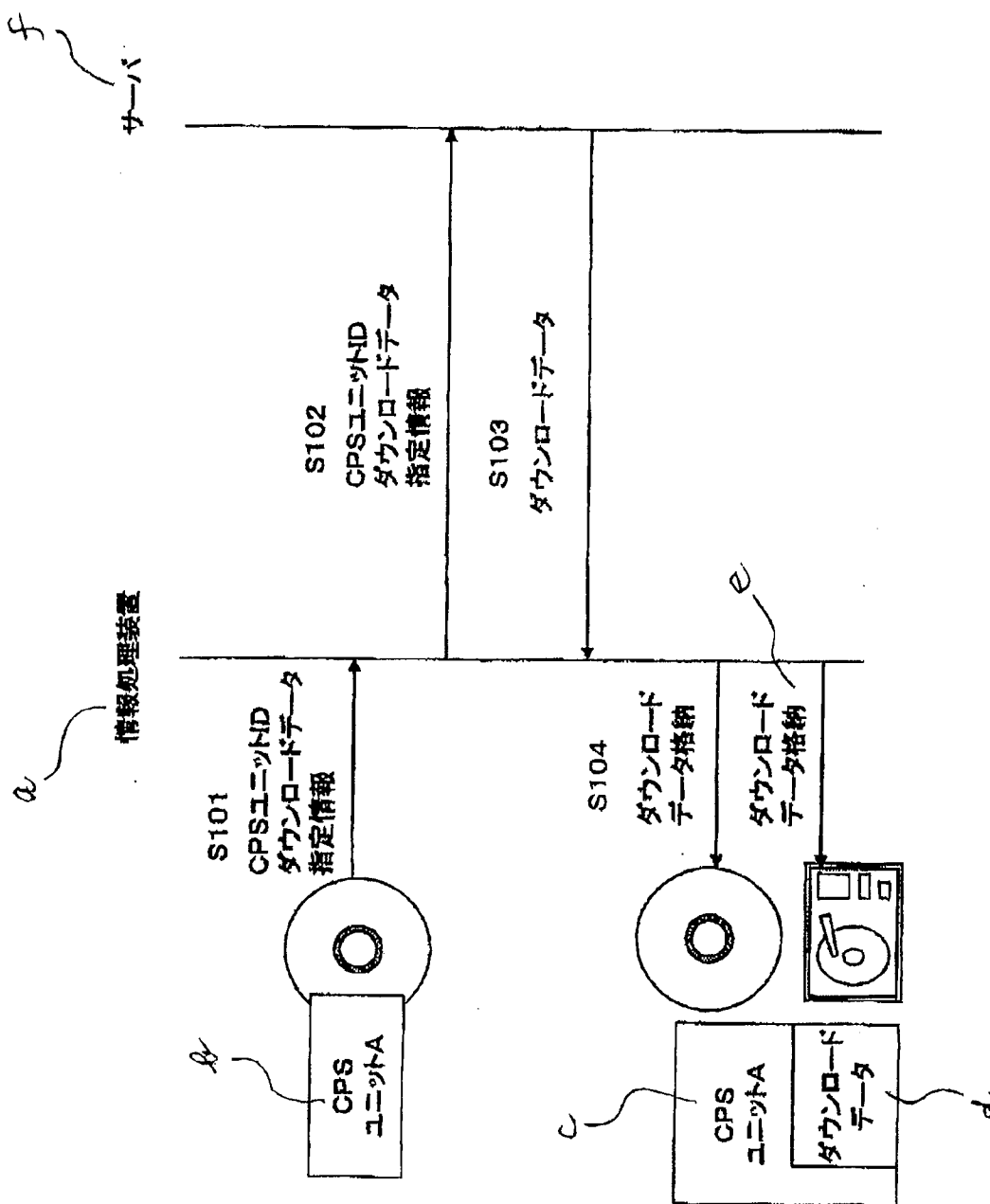
【図5】

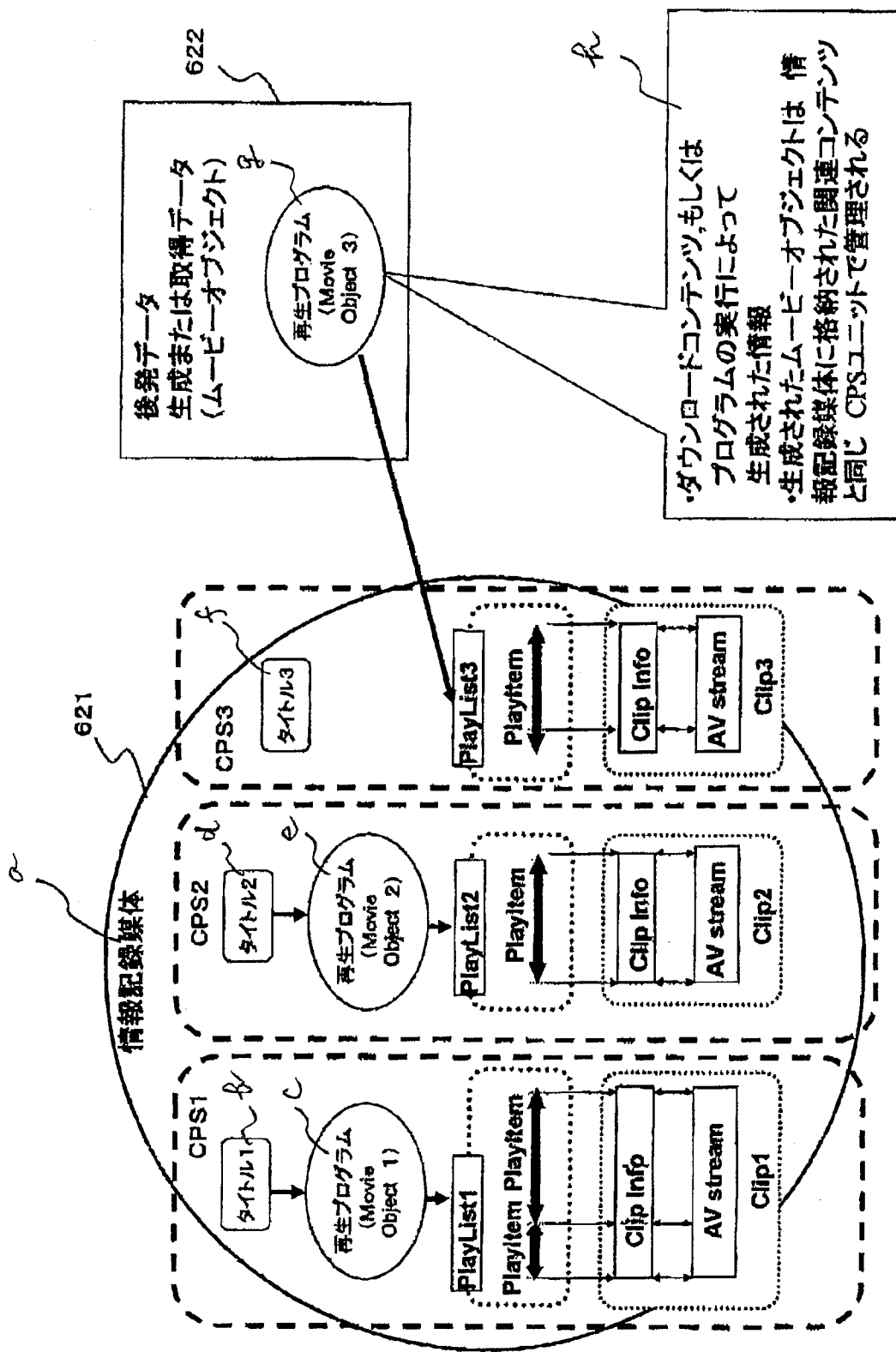


【図6】

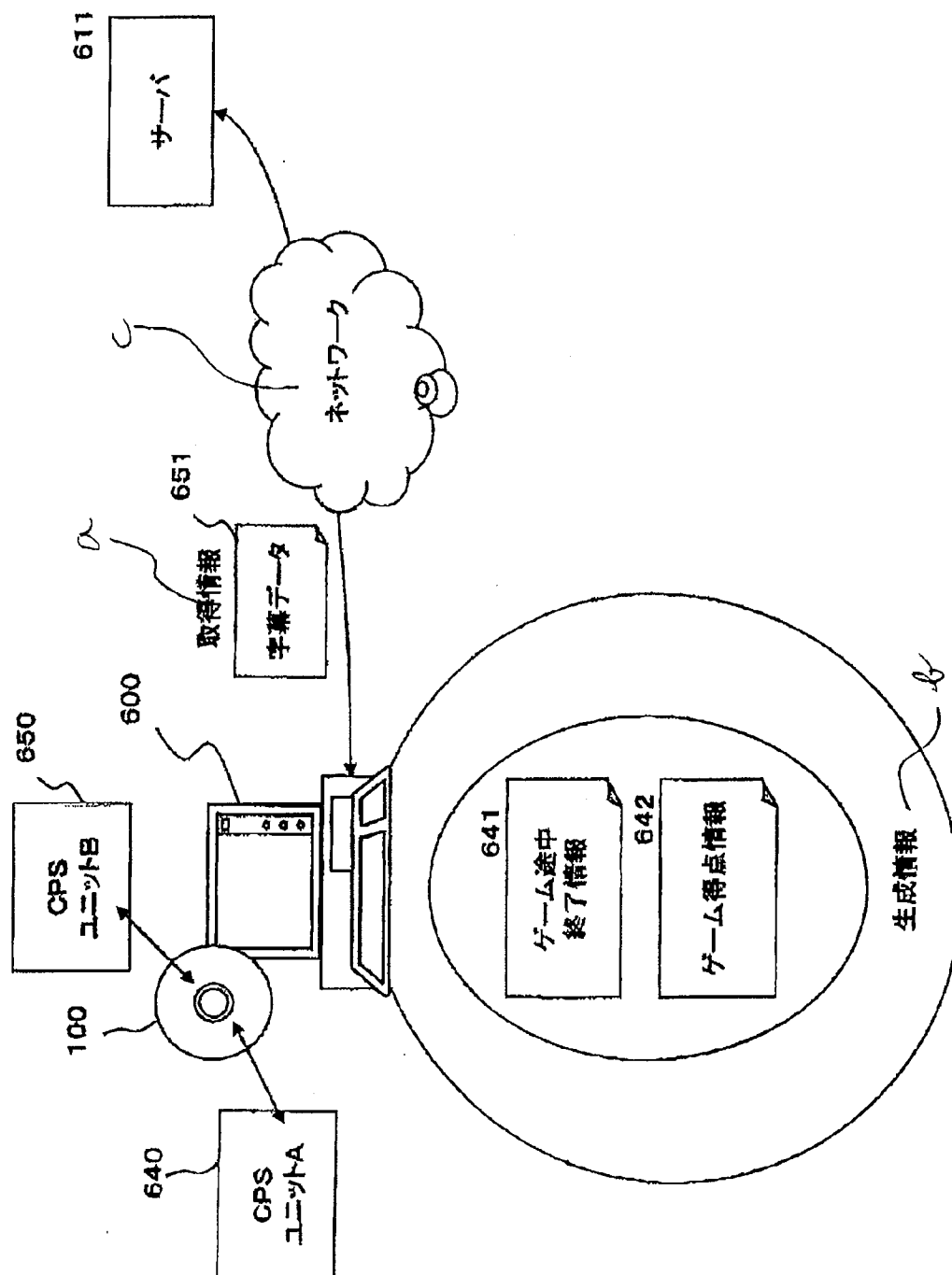


【図7】

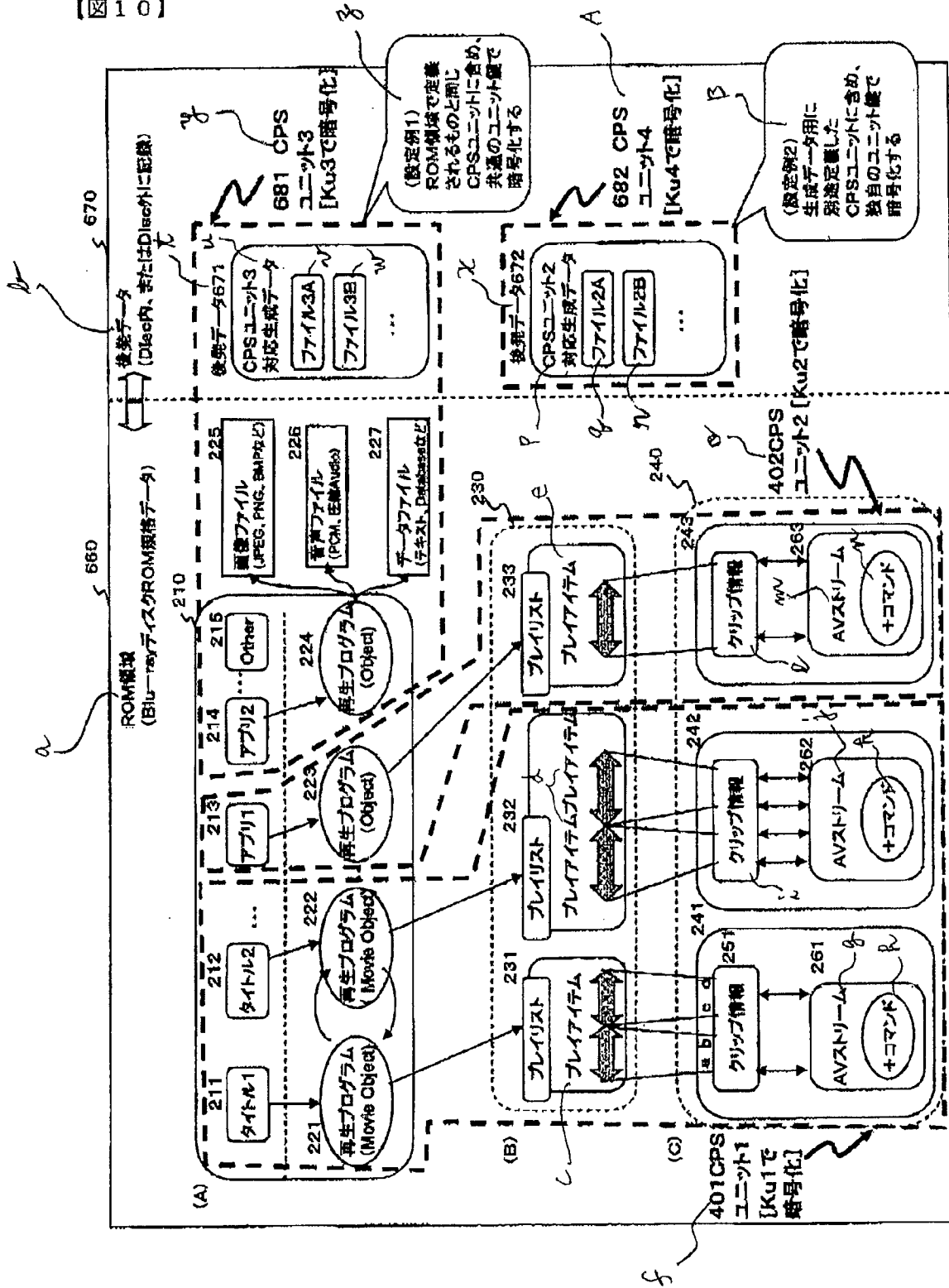




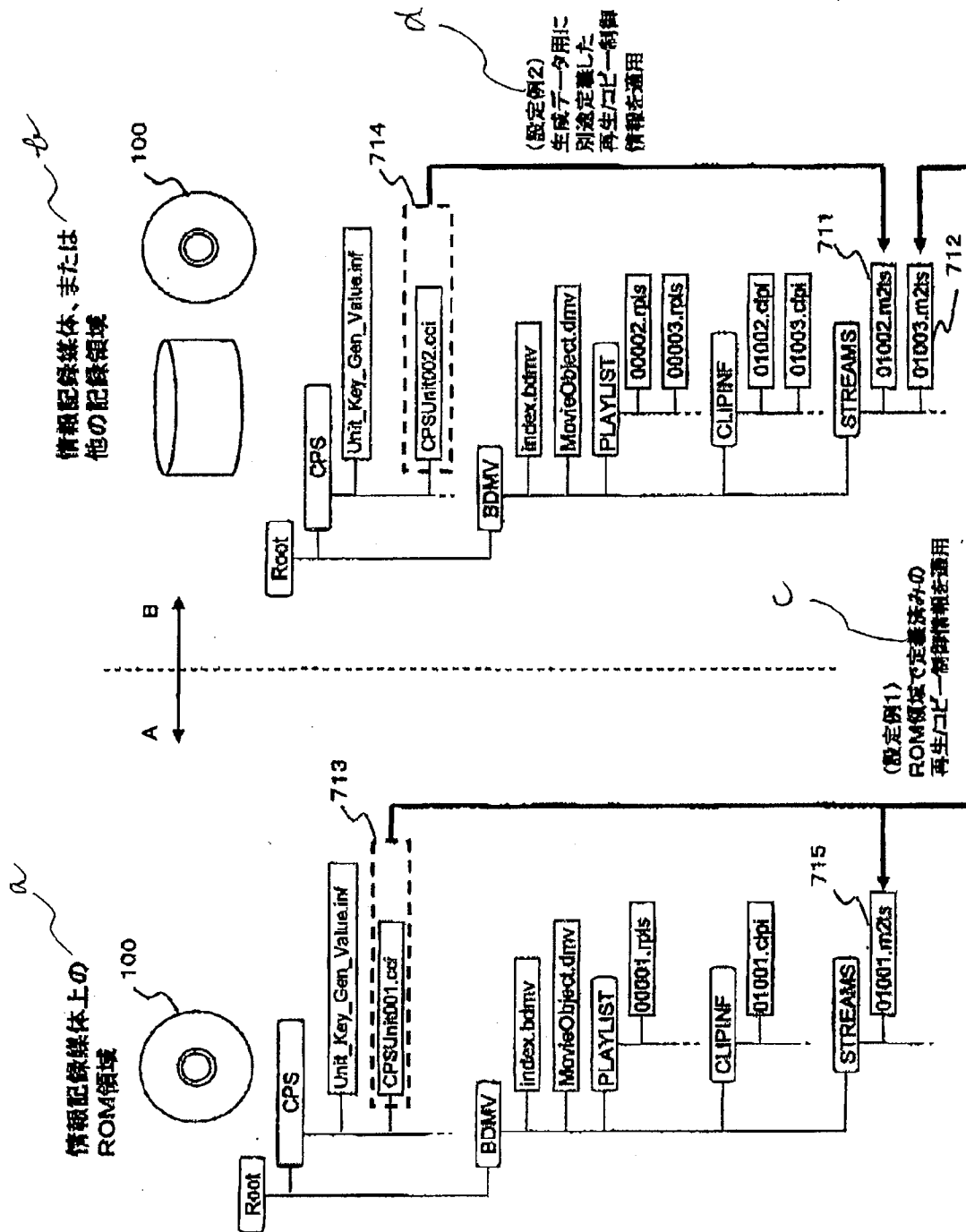
【図9】



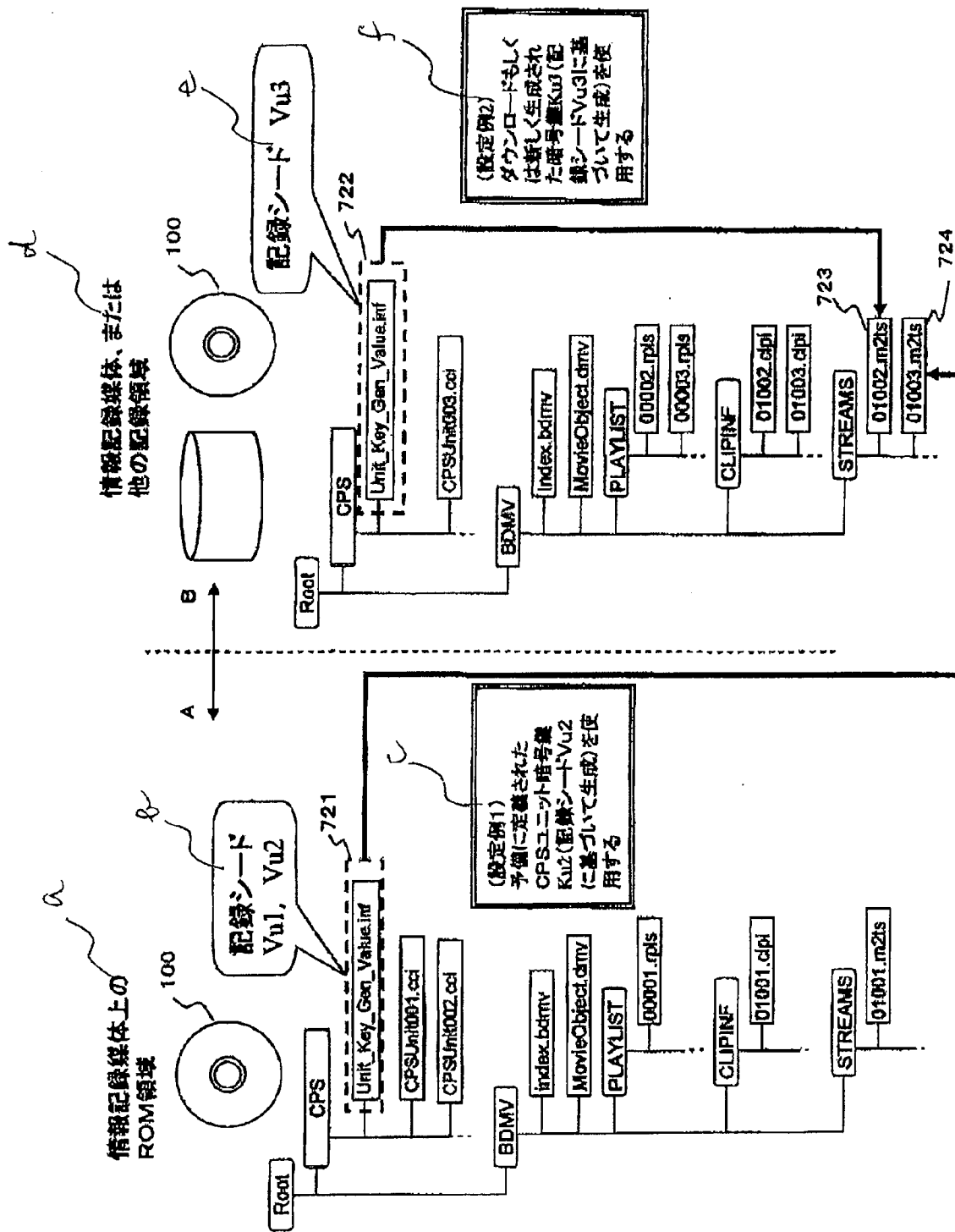
【図10】



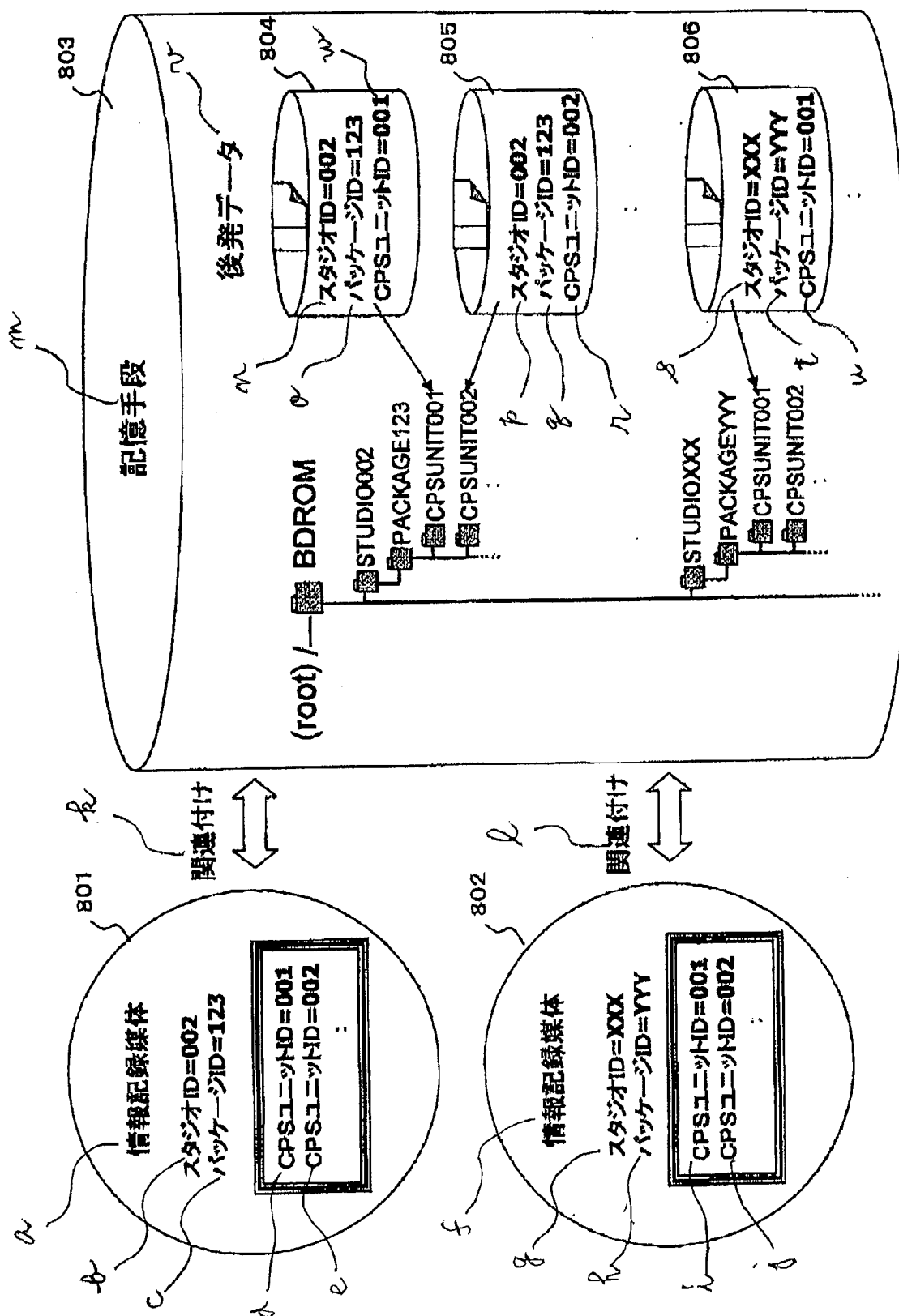
【図11】



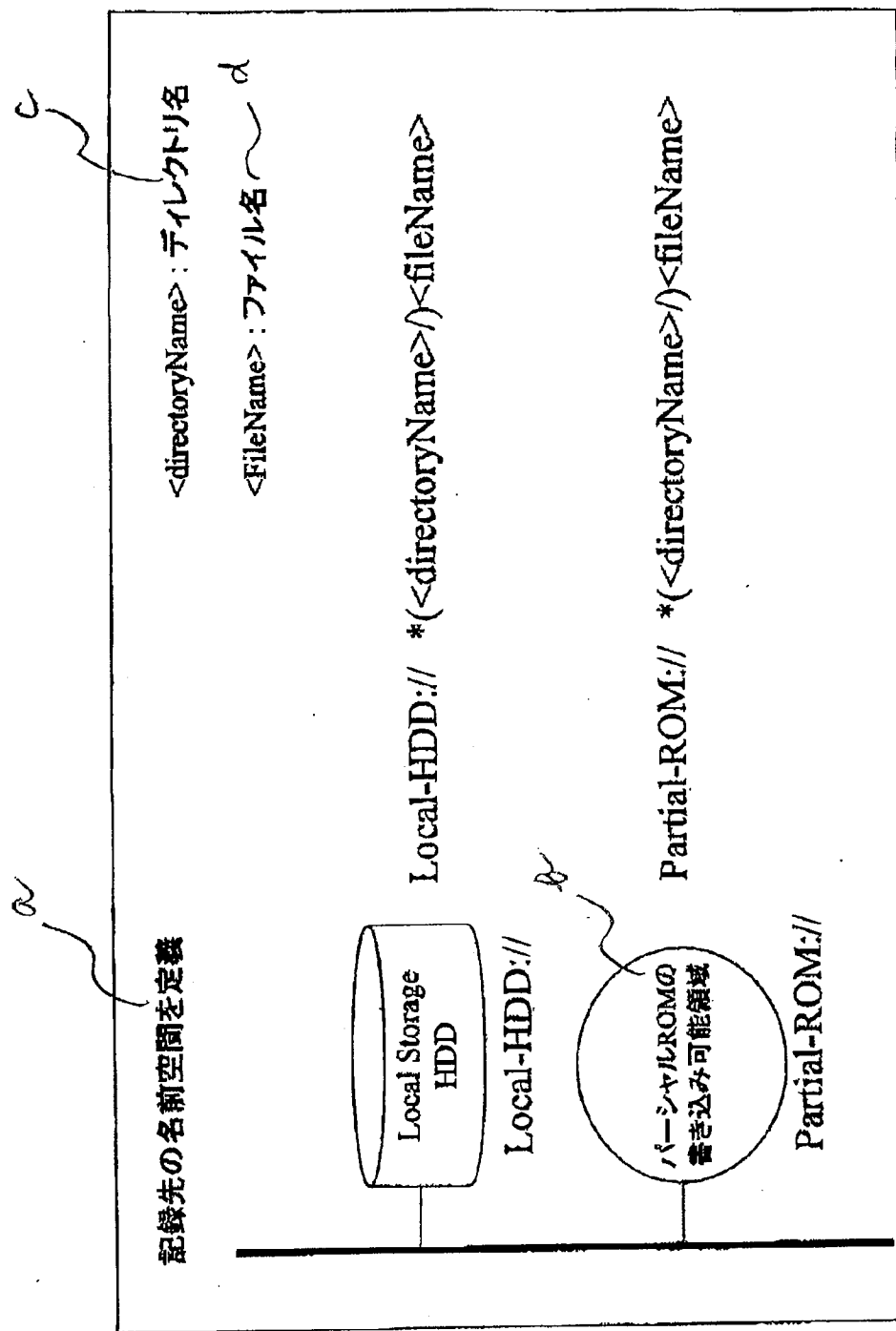
【図12】



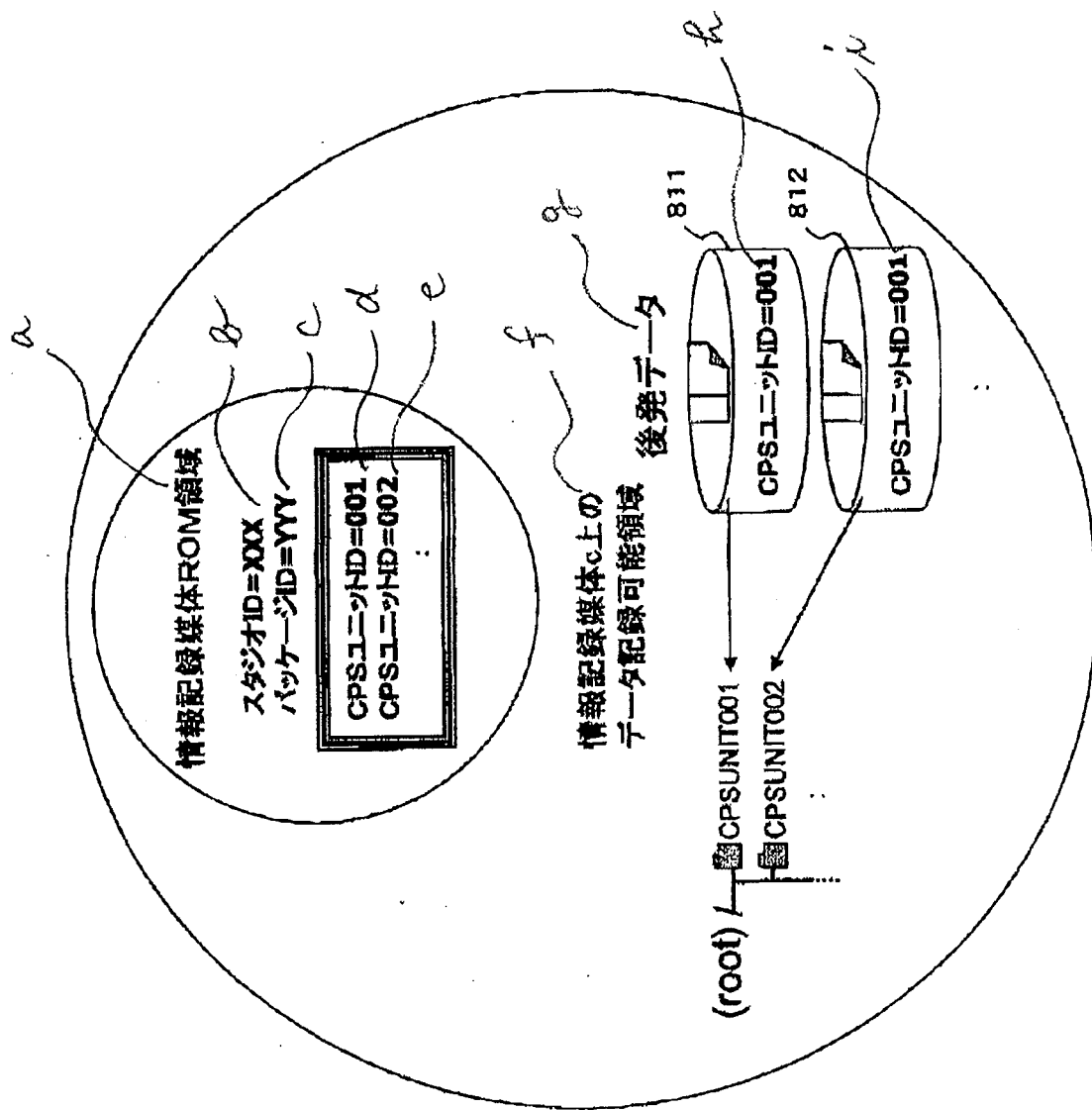
【図14】



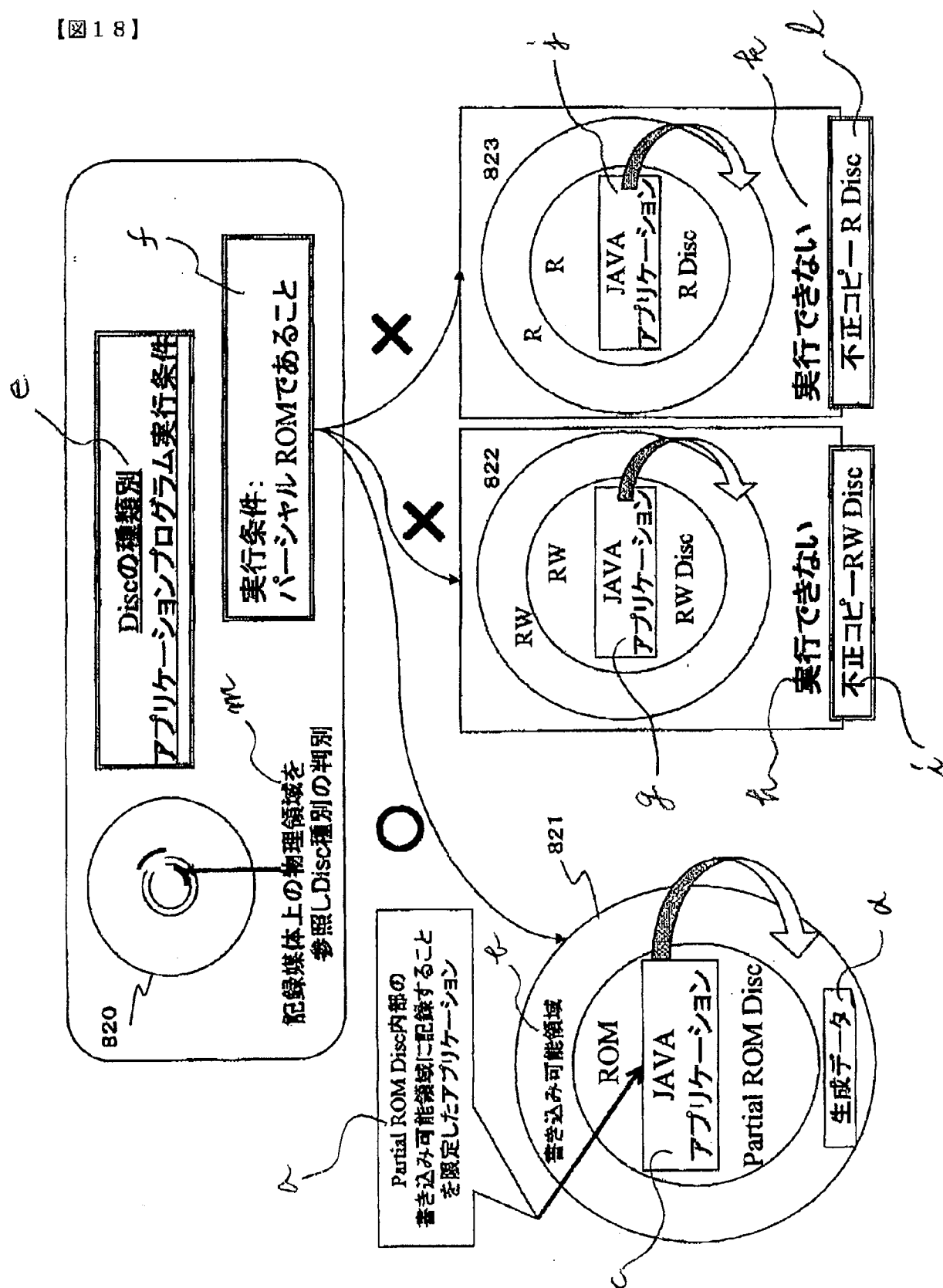
【図15】



【図16】



【図18】



【図19】

